IRON TRADE REVIEW
AND WESTERN MACHINIST

VOLUME XX. CLEVELAND, O., NOVEMBER 12, 1887. NUMBER 46.

BURNING CRUDE PETROLEUM ON THE PACIFIC COAST.

Wood & Iron, San Francisco.

The Mission Transfer Company, and the various oil companies owning stock therein, produce and transport all the crude petroleum now produced in Ventura County, California.

The present capacity of the wells in Ventura County is now seven hundred barrels per day, and new wells are being sunk constantly and the business of exploration conducted with unexampled energy, so that we can safely anticipate that inside of six months the petroleum output of wells in Ventura County will amount to at least two thousand barrels per day.

TRANSPORTATION.

In order to bring this large amount of crude petroleum to this market, the Sespe Oil Company is now building a steamer to be called the W. L. Hardison, whose sole employment will be carrying oil from Ventura County to this city.

The Mission Transfer Company and the Sespe Oil Company have also twenty-seven cars, expressly fitted with large tanks for carrying oil, and they are now plying between the wells and the various distributing points.

The Mission Transfer Company have had built a large tank of seven thousand barrels capacity, which will be located near the Arctic Oil Works, and adjoining the railroad in the southern part of the city, and as necessities require, more tankage will be erected at other points.

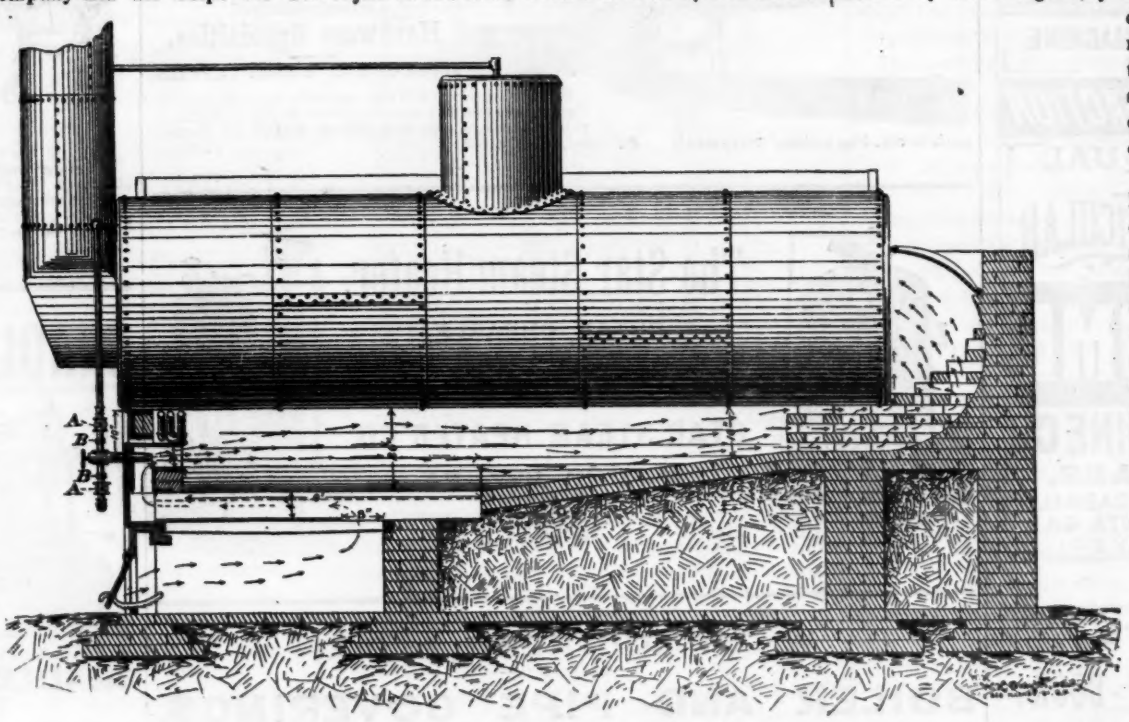
METHOD OF BURNING CRUDE PETROLEUM UNDER BOILERS.

Fill the combustion chamber with ashes or earth within 12 inches of the boiler and on a true circle with the boiler, then pave with common red brick, leaving a space of 10 inches, which should continue from the rear end of the boiler to within 8 feet of the front, where the trench in the center commences, as shown by the drawing.

This trench is to become gradually deeper for a distance of 2 feet, and at that point must be 20 inches below the boiler, and run in a straight line to the front of the boiler. The brickwork on the sides of the trench must be continued to the front also, being built up on the grate bars, as shown.

When the fire-brick tiles, as shown in the drawing, can be obtained it is preferable to use them for the bottom of the trench, but in their absence a piece of sheet iron may be bent in a circle, put in place and a lining of fire-brick and clay put over it. In order to obtain the necessary depth in the trench it is frequently the practice to take out several grate-bars in the center and build a small brick pier underneath, space being left for the air to enter at the rear of the ash pit so that it may become heated in its passage along the space shown underneath the trench. In the drawing it will be noticed that a plate has been placed upon the front end of the grates directly under the trench, forcing the air to enter at the back. This same effect can be produced by brick work when it is necessary to remove the bars, and should be obtained, as the heated air is a great advantage to the proper combustion of the oil. The air coming through this passage is directed through the large pipe encircling the burner. This pipe should be 6 inches in diameter, slightly bell-shaped at the end, and so set as to catch the air entering from the space under the trench, and thus feed the burner with all the air required for combustion. This pipe should extend 4 inches past the mouth of the burner, and when the burner is properly managed the flame will commence at the mouth of the large pipe, being full the size of the opening, and will gradually enlarge until it fills the entire space under the full length of the boiler.

The checker work of brick, as shown at the rear end of boiler, should be carefully set, so that the spaces left between the brick will amount to a third more than the area of the tubes. This checker work should be made of fire brick, and can be put in loosely without mortar. The object of this brick work is to store up heat so that the escaping gases in their passage through this net work of white hot bricks will be thoroughly consumed.



METHOD OF BURNING PETROLEUM UNDER BOILER.—FIG. 1.

The burner is placed as shown, under the center of the boiler, 10 inches from the bottom and inclining down a half inch in its length. In setting the burner have a union joint between the globe valve and burner on both oil and steam side so that the burner may readily be taken out and cleaned.

The oil supply tank should be about 5 feet higher than the burner, and the pipe should pass through the smoke stack so the oil on entering the burner will be heated to about 150 degrees. The steam pipe should pass in through the fire-front to a coil, as shown, over the large pipe and thence to the burner. This will sufficiently heat the steam, thus producing better results than with direct steam. The steam in all cases should come directly from the steam drum or from a large pipe, and never through a small pipe through which steam is being carried somewhere else, as a steady pressure is necessary. In fixing single boilers ¾ inch pipe is large enough for both oil and steam, but when a battery of boilers is to be fed, 1¼ and 1½ inch pipes should be used so that a steady pressure of oil and steam will be assured.

A petroleum fire can be held in perfect control by one man of ordinary intelligence, by the mere turning of a valve. He can increase or decrease the fire at will, and can maintain steam or heat at any desired point. When the fire is properly regulated to produce the heat required, it can be kept at that point with but slight attention, so slight, indeed, that one man can fire and care for a battery of from eight to ten 100 horse-power boilers without difficulty. By turning a valve you can instantly extinguish the fire, as occasion does not requir its continuous use, and it can be again started with almost the same rapidity with a few shavings or sticks of wood. There is no waste, as with coal, when the work is done.

The heat generated with petroleum fire is much more uniform than that produced with coal or wood. The fire is not as sensitive to the fluctuation of the weather as other fires. A great advantage is gained in running machinery where regularity of speed is desirable. A constant supply of steam may be furnished, and there is no reduction of steam pressure in consequence of the replenishing of fires.

Economy in labor, cleanliness and safety are secured, as in burning oil complete combustion may be obtained. There is no shoveling of ashes, and consequently there is a great saving of labor. The absence of sparks and cinders and the ability to extinguish the fire instantly in case of danger makes it very desirable when considered with a view of safety.

There being no necessity for opening doors for the introduction of fuel, here is no fluctuation of heat, and no sudden chilling of the flues and boiler. The absence of sulphur in the fuel makes its action on the metal of the boiler and the flues much less destructive than coal, and the flues remain clearer and in better condition to absorb the heat.

Oil or residuum is without doubt the coming fuel on locomotives and ocean steamers, and by its use a great annoyance to passengers in the emission of cinders and smoke will not only be entirely avoided, but less than one-half the room formerly used for coal will be required to store the oil for fuel, and only one-third the weight will be carried, thus saving a great deal of room in storage, which will enable ship owners to carry an additional quantity of freight, or to increase speed to the same amount of power. Besides this, where 70 stockers are now required to unload coal on ocean steamers, at least 60 could be dispensed with and the work done without the labor of shoveling coal, and the great discomfort from heat and dust.

The fact of being able to produce with oil a perfectly clear white fire, free from ashes, smoke, dust and soot, which can be kept under control and regulated to any

[Concluded on page 763]

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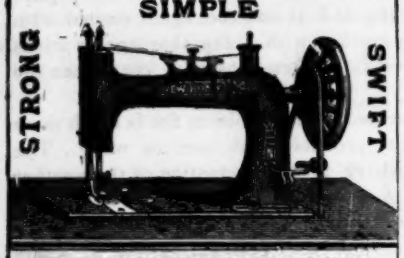

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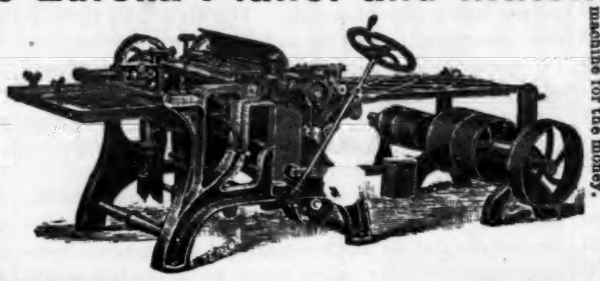

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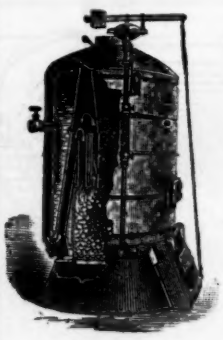

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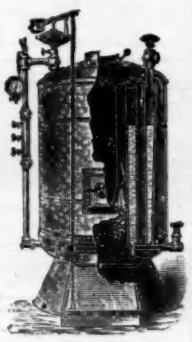

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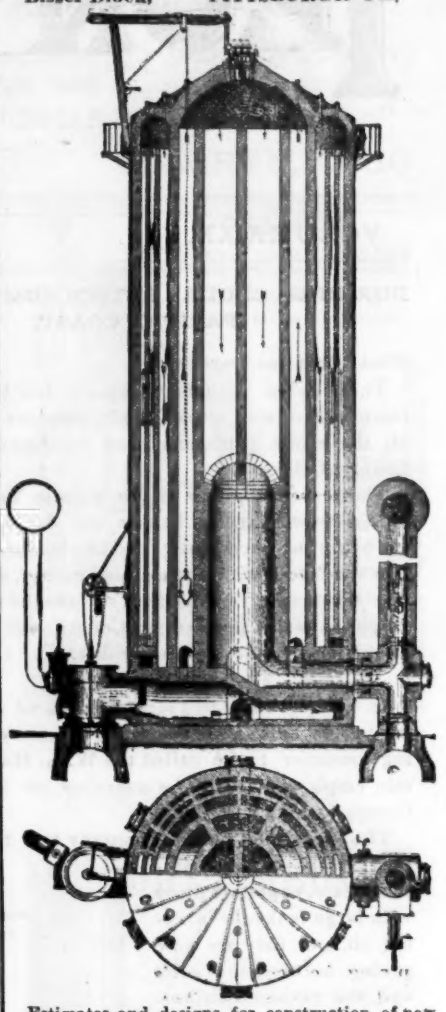

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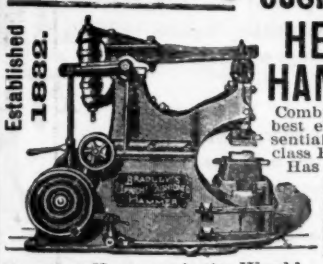

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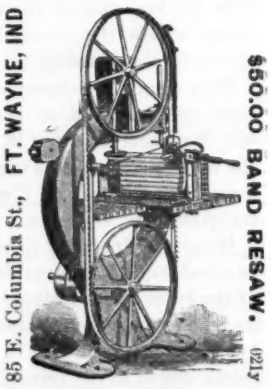

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BURNING CRUDE PETROLEUM ON THE PACIFIC COAST.

[Continued from page 761.]

degree of heat required, makes its use invaluable in the manufacture of glass, steel, crockery, stoneware, sewer pipe, brick, and in fact almost any business where such a fire is required.

One pound of oil will evaporate more water than two pounds of the best coal.

The methods of burning crude petroleum are being improved upon every day, and with the new knowledge gained by experience and through experiments, we have no doubt whatever but that the burning of crude petroleum as a fuel will attain a degree of economy much greater than we have yet reached.

Experiments have been made in the use of this fuel on agricultural machinery, especially traction engines and threshing machines, and it has not only proved much more economical than any other fuel heretofore used for that purpose, but is absolutely safe, there being no sparks emitted from the smoke-stack as when using wood or coal, to the manifest danger of setting fire to the crop in process of being harvested.

It is an invaluable fuel for all electric works, as perfect uniformity of pressure can be secured, which with them is a great desideratum.

It can also be used to the greatest advantage in brick-kilns and pottery works, owing to the absolute control of the heat which can be secured and the great saving of time occupied in burning brick and pottery ware; it having been demonstrated that a kiln can be burnt in less than one-half the time with petroleum that is now occupied in using wood as fuel, and exclusive of the labor consideration, there is an economy of at least 25 per cent. for petroleum as against wood. It is also invaluable for gas purposes. One gallon of oil will produce 70 feet of gas of 80 candle power, whereas one pound of Wellsend coal will only produce 4½ feet of gas of 15½ candle power.

There need be no fear, however, of coal as a fuel being driven out of this market, as 2,000 barrels per day used exclusively for fuel purposes would not supplant more than 10 per cent. of the present consumption of coal and wood. This is particularly an industry that should be commended, and helped in every particular, as it is a product of our own soil, and tends to keep a large amount of money in this State that would otherwise be sent to England and Australia for the purchase of coal.

The above method of burning crude petroleum under boilers for the purpose of generating steam was arrived at after a month of exhaustive and thorough experiments on the part of Messrs. Coit & Folsom. The many original points involved in this method of oil burning are due to the inventive genius of Mr. John C. Quinn, Messrs. Coit & Folsom's mechanical engineer. Mr. Quinn has applied for letters patent covering his many improvements as indicated by the above process. The result attained by Coit & Folsom in using crude petroleum as a fuel has been eminently satisfactory, and equal even if they do not surpass experiments either in the East or Russia, of which they have any authentic record. The demand on the Pacific Coast for crude petroleum to use as a fuel, exceeds the supply, and its merits and many advantages for that purpose are becoming universally recognized.

The parties most heavily interested in these wells, and most active in producing the above desirable results, are W. L. Hardison, Lyman Stewart, Thomas R. Bard and Dan McFarland. Messrs. Hardison & Stewart are men of large experience in the oil wells of Pennsylvania.

They came out here a few years ago, surveyed the ground, and became impressed with the idea that there were vast deposits of petroleum in Ventura County (with them to think, is with them to act), and they not only brought their large experience and wonderful energy into play, but they also invested and caused their friends to invest an amount of money running up into many hundred thousand dollars, in order to develop the oil capacity of that section. They are now reaping their justly earned reward.

Messrs. Coit & Folsom, No. 20 California street, are the selling agents of the Mission Transfer Company and the Hardison & Stewart Oil Company, and their efforts in introducing the oil into this market have met with most unqualified success.

They are now supplying the California Wire Works, the Risdon Iron Works, the Fulton Iron Works, W. T. Garratt & Co., and other customers in this city, and in Oakland are selling this new fuel to the Standard Soap Works, Alameda Water Works, several breweries and other enterprises.

The steamer Pasadena, recently built to ply between Humboldt Bay and San Pedro in the lumber trade, is also fitted up for burning oil, and in her trial trip on the 22d ult., they found the fuel oil to work perfectly, and when required, to produce at least 20 per cent. more steam than the best coal under similar circumstances.

We may add that the use of crude petroleum as a fuel does not injure boilers in the slightest degree, but, on the contrary, has a beneficial effect, and in proof of this assertion, we have the testimony of Messrs. A. J. Stevens and A. N. Towne, of the S. P. R. R. Co., and numerous engineers.

THE EAST CHICAGO STEEL WORKS.

Industrial World.

The East Chicago Steel Works, from the extent and capacity of their building, and the completeness of their appliances in the shape of approved modern machinery, bid fair to become one of the leading enterprises of the country. Eligibly located, at Hammond, Ind., just about a half mile over the border, or the State line that separates Illinois from Indiana, they are accessible from Chicago by no less than six or seven different railroads, and the distance from Chicago being only 20 miles, affords them almost the same facilities enjoyed by our city industries. As it is, they can make Chicago freight rates to all parts of the West. The buildings are of brick and iron, substantially constructed. The factory for steel works is 360x120, and for plate mill, 360x80, with engines boilers, machines, annealing and cooper

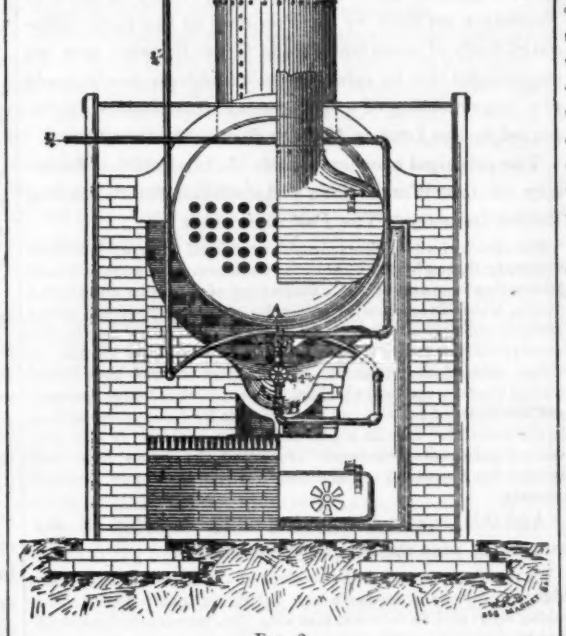

Fig. 2.

shops, in outbuildings in convenient proximity. The capacity of the steel works is 40,000 gross tons of Bessemer steel, and 400,000 kegs of nails per annum. Their nails are made to weight, from the very best materials, and are selected with especial care. None but skilled artisans are employed in their manufacture, and their nails are fully equal to any other brand. Some of their best workmen were brought from Wheeling, W. Va., and constitute the pick of the factories there.

It is claimed that the East Chicago Steel Works enjoy an advantage of location in that they are 450 miles nearer the Northwestern markets than either Wheeling, W. Va., or Pittsburgh, Pa., and that this is a consideration of very material importance that merchants cannot fail to recognize. They are now making nails out of the best grade of Bessemer iron mixed with Lake Superior charcoal Bessemer, which is good for the purpose. The works are turning out uniform, clean nails, and exactly in accordance with the weight they advertise.

Such an institution cannot fail to exercise a salutary business influence not only on the general manufacturing interests of the country, but notably within the limits of its immediate operations. Some of the most thriving of the Eastern towns have sprung from just such local causes as the introduction in their midst of an extensive enterprise like this, and there is no doubt but that in process of time Hammond will, through the instrumentality of the East Chicago Steel Works, take its place in the front rank with the leading manufacturing towns of the West. It may not be inappropriate to mention that M. M. Towle is the proprietor, and Mr. Alexander Glass the manager of the new industry.

EFFECTS OF REITERATED FLEXURE ON CAST IRON.

An account of some experiments made by the Commissioners on Iron has recently appeared in one of our English architectural exchanges as follows:

We have endeavored to answer experimentally in various ways the question whether the substance of metal which has been exposed for a long period to percussions and vibrations undergoes any changes in the arrangement of its particles by which it becomes weakened. A bar of cast iron 5 inches square, was placed on supports about 14 feet asunder. A heavy ball was suspended by a wire, 18 feet long, from the roof, so as to touch the center of the side of the bar. By drawing this ball out of the vertical position at right angles to the length of the bar in the manner of a pendulum to any required distance, and suddenly releasing it, it could be made to strike a horizontal blow upon the bar, the magnitude of which could be adjusted at pleasure either by varying the size of the ball or the distance from which it was released. Various bars (some of smaller size than the above) were subjected by means of this apparatus to successions of blows, numbering in most cases as many as 4,000, the magnitude of the blow in each set of experiments being made greater or smaller, as occasion required. The general result obtained was that, when the blow was powerful enough to bend the bars through one-half of their ultimate deflection (that is to say, the deflection which corresponds to their fracture by dead pressure), no bar was able to stand 4,000 of such blows in succession, but all the bars (when sound) resisted the effects of 4,000 blows, each bending them through one-third of their ultimate deflection. Other cast-iron bars, of similar dimensions, were subjected to the action of a revolving cam, driven by a steam engine. By this they were quietly depressed in the center, and allowed to restore themselves, the process being continued to the extent even in some cases of 100,000 successive periodic depressions for each bar, and at a rate of about four per minute. Another contrivance was tried by which the whole bar was also during the depression thrown into a violent tremor.

The results of these experiments were that, when the depression was equal to one-third of the ultimate deflection, the bars were not weakened. This was ascertained by breaking them in the usual manner with stationary loads in the center. When, however, the depressions produced by the machine were made equal to one-half of the ultimate deflection, the bars were actually broken by less than 900 depressions. This result corresponds with and confirms the former. By other machinery a weight equal to one-half of the breaking weight was slowly and continually dragged backward and forward from one end to the other of a bar of similar dimensions to the above. A sound bar was not apparently weakened by 96,000 transits of the weight. It may, on the whole, therefore, be said that, as far as the effects of reiterated flexure are concerned, cast-iron beams should be so proportioned as scarcely to suffer a deflection of one-third of their ultimate deflection. And as it will presently appear that the deflection produced by a given load, if laid on the beam at rest, is liable to be considerably increased by the effect of percussion, as well as by motion imparted to the load, it follows that to allow the greatest load to be one-sixth of the breaking weight is hardly a sufficient limit for safety, even upon the supposition that the beam is perfectly sound.

Estimation of Coal Contained in a Given Area of Seam.

The *Indian Engineer* says that an approximately correct method of making this calculation is to consider an area of coal one inch thick as containing 100 tons, and this will allow a sufficient margin for faults and loss. Calculated in this way, a seam of coal 24 inches thick will yield 2,400 tons to each area. But to ascertain the exact quantity of coal under a given area, we must first know the specific gravity, then knowing the weight of one cubic foot, the rest becomes a mere matter of calculation. Taking the specific gravities—water being 1·0 and weighing 1,000 ounces per cubic foot—as 1·10, 1·15, 1·20, 1·25, 1·30, 1·35, 1·40, 1·45, 1·50; we have the following weights in the natural bed per acre per inch thick in tons: 111·411, 116·475, 121·540, 126·604, 131·668, 136·732, 141·796, 146·860, 151·925, and the weights of a cubic foot in the broken state in pounds will be of large coal—42·62, 44·56, 46·50, 48·43, 50·37, 52·31, 54·25, 56·18, 58·12; and for small coal—37·12, 38.81, 40·50, 42·18, 43·87, 45·56, 47·25, 48·93, 50·62. In measuring heaps of coal in England it is customary to allow 45 cubic feet to one ton.

IRON TRADE REVIEW
WESTERN MACHINIST

A JOURNAL OF THE

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THE IRON TRADE ALL RIGHT.

It will be interesting to American iron manufacturers to learn, not from American but from English sources, that a "more sombre tone" has been recently detected in the iron trade of the United States. Additional apprehension (or amusement) will doubtless be aroused by the statement that "it is doubtful whether the depression which has set in has reached at present its maximum development." Has anyone noticed any depression stalking around the country? If this is depression, our manufacturers can stand a great deal more of the same kind.

More amusing still are the reasons assigned for "the present weakness." The first is "the overbuilding of American railroads during 1886 and 1887," and the second is, according to the same reliable authority, "the inherent viciousness of American railroad finance." "As regards the first of these two adverse influences," rambles along our exceedingly well informed critic, "there is nothing very novel or unexpected about it. Every now and then they go in for what they term a 'boom' in American railroad building. One year they build, say, 2,500 miles of new line; the next year 5,000 miles are constructed; in the next 7,500 miles; and in the next 10,000 or 12,000 miles. Then the boom has worked itself out; everything is said to be 'off the boom,' and something like a crash comes. This was what happened in 1873, and this is what is happening now, the only difference between the situation of 1873 and that of 1887 being the facts that since 1873 the United States have become a more powerful, populous and prosperous community; that the new lines undertaken in 1885, 1886 and 1887 have been for the most part carried out by Americans with American capital; and that the rate of interest on money has greatly declined during the last fourteen years, the result being that the strain of new interest charges is rendered less severe."

We should rather say, that the only difference between 1873 and 1887 is, that in 1873 there was a crash, while in 1887 there is nothing in the nature of a crash, nothing betokening a crash, and nothing likely to lead to a crash, under the present condition of things. The very reasons assigned by our English contemporary are a sufficient refutation of its own conclusions. It is true, that "since 1873 the United States have become a more powerful, populous and prosperous community," and for this reason the conditions necessary for a panic are absent. It is also true that the new lines undertaken within the past three years have been very largely carried out by Americans with American capital. This shows, if it shows anything, that we are no longer heavy borrowers but are becoming entirely competent to take care of our internal affairs without assistance from abroad. The element of foreign distrust cannot, therefore, enter so seriously into any disturbing movement in financial circles. Add to this the fact that "the rate of interest on money has greatly declined during the last fourteen years," and we have a still further reason why a panic at this time is impossible. Our business interests were never under conditions more favorable for resisting a foreign attack upon our credit than now.

As to the "inherent viciousness of American railway finance," we presume there will always be a more or less viciousness in all railway finance, whether American, English or Continental; but that this evil is characteristic of and inherent in our American system we not only deny, but we challenge proof to the contrary. The simple fact of the matter is, that the American iron trade is in as solid and prosperous a condition to-day as it ever was. If we "'tend our own knittin'" there need be no fear of the direful forebodings which seem to find congenial lodgement in the brain of our English friend.

PROTECTION WINNING ITS WAY.

Sooner than British political economists appear to realize, the workingmen of that country are finding out the difference in the condition of labor under Free Trade and under Protection, and are flocking to the support of the latter as the natural remedy for the evils from which they suffer. Recently we gave an extract from a remarkable address before the British Iron and Steel Institute, showing the strong views in favor of Protection set forth by the President of the most influential body of manufacturers in Great Britain; now we supplement this by reference to an address lately made to a large meeting of workingmen and tradesmen, as reported by the London *Morning Post* of October 20.

The principal speaker was Mr. J. H. Pettifer, Secretary of the Workingmen's Association for Protecting British Industry. The *Post* report says:

> The speaker, whose views, despite occasional interruption, were evidently shared by the bulk of the audience, gave a lengthy and interesting account of his experiences of trade in the United States, whose Protectionist policy he warmly approved, while strongly condemning the system of Free Trade prevailing in this country. Contrasting the condition of the working classes on either side of the Atlantic, Mr. Pettifer showed that in the United States wages were higher, the people were better dressed, and unemployed persons and beggars were far less numerous than in this country. This he attributed almost entirely to the prevailing policy of strenuously protecting the home industries against the encroachment of cheap foreign labor and untaxed imports.

And this, from a communication to the *Post* of the same date, puts the case very compactly:

> We may have to pay the equivalent of any import duties in the higher prices of the goods we buy, but surely that is better than seeing men, willing to work, standing idle, manufactories closed, and capital being sent to foreign countries, employing labor there under Protection, instead of percolating through every district of this country in the form of wages, and giving employment to thousands who are now out of work, and better wages to others earning barely sufficient to keep them out of the poor house. Those thousands are slowly getting restless under their enforced idleness and poverty, and, whether political economists like it or not, Protection they will sooner or later demand.

How worse than senseless is the policy that would transfer to American soil a condition of things against which such earnest protests as the above can so truthfully be urged.

A VAPOR STOVE INDUSTRY FOR CANADA.

Cleveland, as the center of the vapor stove industry of the United States, is interested in the efforts now being made to introduce that manufacture into Canada. Naturally the first obstacle met with is the obduracy, not to say ignorance, of some insurance companies. The *Canadian Manufacturer*, which has been doing a great deal to encourage the establishment of new enterprises in Canada, quotes, in a recent issue, a letter from a prominent manufacturing concern in Canada who had proposed going largely into the manufacture of vapor stoves, but were deterred from doing so by a fire insurance company which were carrying risks for them. The ipse dixit of the insurance company was that they would take no risks where vapor stoves were in use; that they would cancel all existing risks where vapor stoves were introduced, and that the manufacturer to whom the threats were being addressed, who had recently introduced a vapor stove into his own residence, must immediately remove the same, or have his fire insurance policy cancelled.

This is going back to the days of tallow candles and stage coaches with a vengeance. Identically the same course was pursued in relation to the introduction of kerosene oil, illuminating gas, railroads, and other modern improvements, and with just as brilliant prospects of bucking the heads of the objectors against a stone wall. It did not require the insurance companies of the United States very long to come to the fact that there was no more danger in the use of vapor stoves than in the burning of gas, so long as reasonable care was shown. The battle was of short duration, and resulted in complete victory for the vapor stove interest, showing the quick appreciation, by the insurance companies, of the fact that the inevitable is one of the few things that must be yielded to, the sooner and more gracefully the better.

That this surrender—if we may so term it—of the insurance companies is based upon common sense is evident from the following figures quoted by the *Manufacturer*: In statistics of fires occurring in one year in eleven American cities where vapor stoves were in use, it is shown that there were 168 fires arising from defective chimney flues, occasioning losses aggregating $22,122; overheated stoves and stovepipes, 70 fires and $6,307 losses; hot ashes, 29 fires and $20,360 losses; sparks, 83 fires and $3,565 losses; coal oil explosions, 58 fires and $14,875 losses; oil stoves, 6 fires and $356 losses; illuminating gas, 37 fires and $19,923 losses; and vapor stoves, 11 fires and $164 losses. Here we have 462 fires originating from 8 specified causes, involving losses aggregating $87,672; but out of these but 11 fires were attributed to vapar stoves, the losses from them amounting in all to only $164. But insurance companies do not refuse to take risks against fires caused by defective chimneys and flues, hot ashes, sparks, overheated stoves and stovepipes, lamp explosions and upsettings, oil stoves nor illuminating gas, although, as shown in the figures above given, out of every 42 fires occurring but one arose from vapor stoves, and for every $535 lost by such fires, but one dollar is chargeable to the vapor stoves.

The vapor stove industry of the United States is on a solid basis, and there is no reason why Canada should not build up a similar business despite the opposition of fossilized insurance companies.

THE condition of the blast furnaces of the United States remains about the same as one month ago. November 1st there were in blast 124 anthracite furnaces, with a weekly capacity of 40,028 tons. This is an increase of one furnace and 588 tons' capacity over October 1st. On the 1st of November there were 151 bituminous furnaces in blast, with a weekly capacity of 90,459 tons—one less furnace but 1,336 more tons' capacity than on October 1st. Seventy-one charcoal furnaces were in blast November 1st, their weekly capacity being 12,344 tons, as against 71 furnaces in blast October 1st, with 12,118 tons' capacity. Production in the Mahoning and Shenango valleys and at other points in Eastern Ohio continues heavy.

HERE is an additional illustration of the indefinite and valueless industrial item, as too often given by country exchanges. It is from the Oshawa (Ont.) *Vindicator:* "The reeve has received a letter from the authorities of a large manufacturing company offering to start their business in Port Perry provided they receive a suitable bonus. They propose to employ fifty men, principally heads of families, with the prospect of further increasing the number employed." What, pray, is the name of the manufacturing company; where is it located; what does it propose to manufacture; how much of a bonus does it want; on what principles of justice to existing manufacturers in Port Perry should a bonus be granted?

THE postal card in business is a tattling interloper. It is a traveling nuisance. It has a seedy and sneaking appearance. It has the look of the man that asks the loan of ten cents until to-morrow. Its breath is bad. Kick it out.—[IRON TRADE REVIEW. We have never used a postal card.—[Editor Bulletin of American Iron and Steel Association.

We congratulate you on your good sense, Mr. Swank, and move your appointment as temporary chairman of the American Business Men's Anti-Postal Card Association,

THE GREAT MINERAL REGION OF NORTH CAROLINA.

C. H. Henderson in the Philadelphia Ledger, October 25.

From the Hudson river at Newburg to the winding Tennessee, below Chattanooga, the "Great Valley" extends in one almost unbroken line. In New York, it is known as the Walkill Valley, in Pennsylvania as the Kittatinnny and Cumberland valleys, in Virginia as the Shenandoah, while still further South it is known as the Valley of East Tennessee. But in whatever State it may lie, or by whatever name it may be known, the Great Valley is everywhere underlaid by vast bodies of limestone and its surface dotted with highly cultivated farms, whose fertility has made the name of the valley synonymous with plenty.

The rocks of the North Mountain, geologically speaking, lie on the top of the valley limestone and are composed of the slates and sandstones belonging to that period of the geologic history known as the Upper Silurian. They are among our oldest fossiliferous rocks. The rocks of the South Mountain, on the other hand, dip under the valley limestone, and belong to still older geologic times. They are the primal slates and sandstones of Pennsylvania geologists. They are underlaid in their turn by the oldest rocks known, the granites and schists of Azoic times. These crystalline rocks crop out along the ridge of the South Mountain, and are of the first importance as being the repositories of extensive and valuable beds of iron ore. On the border land between the States of North Carolina and Tennessee the iron ore forms such a prominent member in the strata of the dividing ridge that it has given the name of Iron Mountain to this part of the great smoky range.

Leaving the trough of the Great Valley at Johnson City, Tenn., a short narrow-gauge railroad runs in a southeasterly direction, just over the border line, into North Carolina. For several miles the railroad traverses the limestone through such suggestive localities as Happy Valley until it reaches the wild gorge of the Doe river. Few Colorado canons afford finer geologic sections than one finds here. Thousands of feet of rock are open to view, strata lying upon strata, with their upturned edges exposed in regular order like the leaves of a gigantic volume in which is recorded the history of the earth. When these formations have been crossed the road passes on to the older crystalline rocks, and so continues until its terminus is reached at Cranberry.

Here the Cranberry Iron and Coal Company has built up a thriving, active community where five years ago there was nothing but a few mountaineers' cabins. It has expended about $1,400,000 in building the narrow-gauge railroad from Johnson City, in opening the mines, in constructing furnaces, ovens, and other necessary adjuncts, and in creating a well-equipped town in the midst of a mountain wilderness.

The iron mines are located immediately in the town, and are, of course, the life of the entire enterprise. Formerly all of the workings were underground, the ore being removed through a tunnel. Now, however, nearly all the mining is on the surface, and reduces itself to simple open-air quarrying. The ore is chiefly the magnetic oxide of iron. It varies considerably, both in its appearance and physical properties. In some places it is very fine-grained and difficult to break into convenient pieces for handling. In others, again, it is so coarsely crystallized that it breaks almost too readily, and forms a coarse iron sand.

The foot wall of the vein (the country rock on which the vein rests) is a five-grained gneiss. The width of the vein has not yet been determined. From the foot-wall the excavation measures at least 200 feet in width, and no hanging wall or other boundary to the vein has yet been reached. It must not, however, be understood that this 200 feet is all ore. Far from it. A large proportion is epidote and other intrusive minerals, the magnetite occurring in irregular masses throughout this vein material. On its length the vein has been uncovered in spots over several miles, giving ground for the belief that it is a true fissure, running through the country for long distances. Experience has shown that this huge vein is very unequally mineralized.

Three large benches have been excavated and the mountain side made to assume the appearance of a very large quarry. Day and night the work of demolition goes on, the mine eating further and further into the mountain at the rate of 225 tons of ore each twenty-four hours. Day after day the long trains of loaded cars pass down the gorge to feed the ever-hungry iron furnaces. The ore is sold in lots of fifty and a hundred thousand tons, most of it being shipped to the furnaces of the Roane Iron Company, at Rockwood, Tenn., and of the Shenandoah Iron Company, at Milnes, Va. It is said to average about 50 per cent. metallic iron, its chief value being its purity. Those troubles of the iron-master's life, sulphur and phosphorus, are almost absent. The ore is, in consequence, admirably adapted for the production of Bessemer steel, or for other purposes requiring great purity in the raw material.

The town of Cranberry is very prettily located among its iron-sinewed hills. A small charcoal furnace stands in the centre of the town. It consumes about twenty-five tons of ore daily, producing from ten to eleven tons of pig metal. The ore for this use is first roasted, to make it more friable, and is then broken in a stamp mill to the size of a goose egg. The furnace is about fifty feet high, and has a three-foot crucible. In appearance it differs from our own furnaces in having a vertical outline from the bosh to the tunnel head. It is operated by hot blast.

A GREAT INDUSTRY THAT WE MIGHT HAVE.

To the Editor of the IRON TRADE REVIEW:

In view of the approaching congressional struggle between a policy of Free Trade and that of Protection, it will be well for those whose patriotism demands a production of all America's requirements that are capable of evolution from her innate resources, whether they are of the Republican or Democratic faction, to steadily and always keep in remembrance the anomaly existing between the present tariff exaction on iron and steel sheets, and their product in tin plates, whereby the latter is expunged entirely from the roll of American manufactures, to her loss both in money and independence.

America possesses all internal resources for the production of tin plate, unrivalled in extent and quality, but does not revel in cheap labor as abroad; and she now wants but simply justice extended to this industry by a reinstatemant of its former tariff to enable her doing so. In connection with a report of a recent meeting of the Swansea Trade Exchange, the magnitude of the tin plate trade was approximately stated at 500,000 tons annually, and the bulk of this generally finds its way, and is consumed, in a country, that is eminently capable of fabricating the article herself—now paying away her money needlessly to enrich foreigners. The question is—do we expect to run continuously in the old groove, importing our tin plate as heretofore, or reinstate tariff to the ratio of duty analogous to that imposed upon its base or body material of black plate, and thus permitting the manufacture of tin plate in America? Will the forthcoming Congress decide the matter? It intends tackling tariff with a view to reductions. Will it reduce revenue by reinstating the duty on tin plate, shutting out importations and enabling us to manufacture ourselves?

To produce the 500,000 tons of finished tin plate, there are required about 750,000 tons of pig iron; 10,000 tons of block tin; 800,000 tons of coal, from the bar on to the finished plate; and about 2,000,000 tons of coal are used if calculated from the pig iron. Statistics have been repeatedly given in connection with this subject, and the apology for a recapitulation here exists in the desire to emphasize the vast importance of this industry as contributing to the benefit of capital, employment of labor, and development of the country; fixing them indelibly upon the memories of the patriotic section of our legislature in their forthcoming combat with the Free Trade element in Congress.

England is now experiencing the initial throes of an agitation that may presently shake her to the core, the resultant of a Cobden policy of Free Trade, and to the baneful effects of its continued perpetuation she is daily becoming more fully alive. Do we want another edition of the trouble here by an endorsement of a policy seen to be demoralizing a neighboring nation? If so, then embrace Free Trade without delay; receiving its mortuary shroud to American wages, stagnation to manufactures, and collapse of all business enterprises. Yours Faithfully,

WILKINS TRICK.

HUBBARD, O., Nov. 3d, 1887.

THE foundry business has grown to very large proportions this year, and within three years the size and cost of equipment has greatly increased. After fifty large foundries, worth from $50,000 to $150,000, are now under course of construction.—[Philadelphia Record.

ENGLISH locomotives are disappearing, and an American pattern is taking their place. The American design is superior in all respects. The peculiarity of the American engine is that the of the weight is over the drivers.

LAKE SUPERIOR IRON NOTES.

Special Correspondence of the IRON TRADE REVIEW.

FLORENCE, Wis., Nov. 9.—The number of mines which have stopped shipping has been materially increased during the present week, and there is a very large falling off in the amount of ore sent forward by lake. Vermilion and Gogebic mines have about stopped shipping entirely, and many mines in the other two districts have ceased shipping. On the Marquette range the Titan and Beaufort mines have both been shut down within a couple of days, and the Florence and the Iron River mines, in the Menominee district, have been closed, and it is reported that the Youngstown mine, in the same district, has been shut down. These last three mines are controlled by the Brier Hill Coal and Iron Company, of Youngstown, Ohio, and are included in the Lake Superior consolidation. They will be operated again by January 1 at the latest, however, and work may be resumed at one or two of them in a couple of weeks.

There is considerable exploratory work in progress in all of the districts, and most of it will be continued right through the winter.

Winter shipments of ore by all-rail routes will be commenced very soon. All of the railroads traversing the mining country will haul ore during the winter, mostly to Milwaukee and Chicago. The shipments of ore by rail before January 1 will materially increase the total output of the Lake Superior country for the present year.

The re-organization of the Minnesota Iron Company and the Duluth Iron Range railroad were perfected at Chicago a few days since. The capital stock of the Minnesota Iron Company has been raised from $10,000,000 to $14,000,000, the capital stock of the railroad company, which is owned by the same company, remaining at $500,000. The re-organization is as follows: Duluth & Iron Range Railroad Company directors—H. H. Porter, Chicago; Marshall Field, Chicago; R. P. Flower, Benjamin Brewster, H. R. Bishop, D. O. Mills, H. M. Flagler, David Dows, New York; George H. Ball, Boston; P. H. Kelly and George C. Stone, St. Paul; and R. H. Lee and C. Tower, Jr., Duluth. Officers—H. H. Porter, chairman; H. R. Bishop, president; R. H. Lee, vice-president; C. W. Hillard, secretary and treasurer. Executive committee—H. H. Porter, H. R. Bishop, Benjamin Brewster, R. P. Flower, C. Tower, Jr. The organization of the iron company was as follows: Directors—H H. Porter, J. C. Morse, Marshall Field, H. R. Bishop, R. P. Flower, Benjamin Brewster, Henry Siebert, H. M. Flagler, D. O. Mills, C. Tower, Jr., P. H. Kelly, George C. Stone, Samuel P. Ely. Officers—chairman, H. H. Porter; president, H. R. Bishop; treasurer, A. J. Patterson; assistant treasurer and secretary, C. P. Coffin, Chicago. Executive committee—H. H. Porter, H. R. Bishop, Benjamin Brewster, Jay C. Morse, C. Tower, Jr.

A Curious Fact.

Stationary Engineer.

The fact that the usual heat produced by friction is absent when the articles are magnetized, is just now being discussed by scientists who are seeking an explanation. Very striking examples are described in a late number of a scientific periodical. A workman fastened a couple of powerful magnets to his lathe to hold more securely a piece of metal which he wished to drill and turn. The presence of the magnets kept the metal so cold that no water was needed to keep the drill moist and cool. This unusual circumstance may lead to important mechanical advantages. It is such circumstances as the one noted above that lead to valuable discoveries. The scientists, who are looking for a reason why the heat should be absent may not hit upon any valuable idea, but some practical mechanic probably will.

Matter For Serious Thought.

Stationary Engineer.

The steam boiler explosions for the past month destroyed fifty-eight lives, and seriously injured thirty-six. This fact should engage the earnest attention of the public, and lead to legislation that shall put a stop to this wholesale murder, by idiots who assume to operate boilers without having the knowledge that would enable them to do it safely.

AN account of a recent factory fire in a natural gas "boom" town states that the loss was nearly total on account of lack of water. We suppose the fuel bills of the firm were cut down by removal to the gas town, but the question is, Where does the saving come in where adequate fire protection is not furnished?

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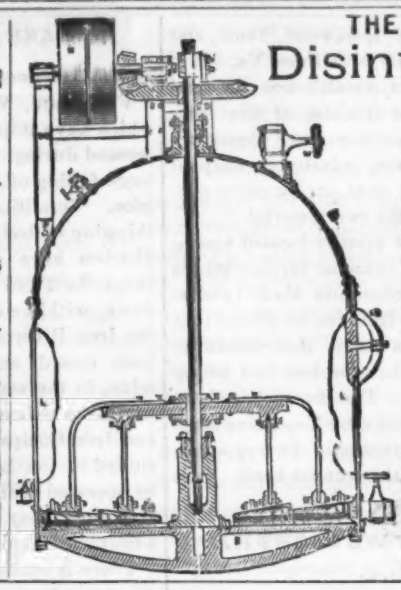

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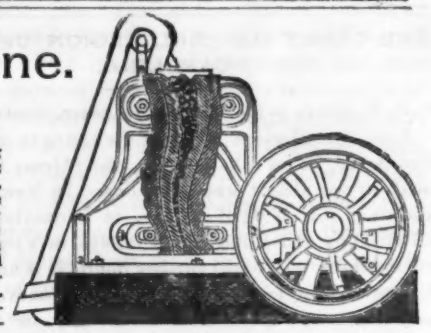

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PROTECTION AND FREIGHT CHARGES.

Chattanooga Tradesman.

There has been a great deal of complaint among those who favor what they call "tariff reform" that the protection of steel rails increased the cost of railroad equipment, and hence makes freights high. The ordinary inference from the writings of this class of economists is that the freight charges in the United States are far greater than in England and on the continent of Europe, where rails are much cheaper than with us; but exactly the opposite of this is the truth. The following table showing the average freight charge per ton per 100 miles, in various countries, is made up from data prepared by an English statistician:

	Per ton per 100 miles.
United States	$1.26
Belgium	1.40
Germany	1.68
Italy	2.16
Austria	2.22
Holland	2.30
Great Britain	2.70
France	3.08
Sweden	3.20

It will be observed that the lowest of these foreign rates, that of Belgium, is 14 cents higher than in the United States. The average of the eight European countries given is $2.34, nearly double the American rate. Great Britain's rate, $2.70, is 112 per cent. greater than America's and the average of the eight is 85 per cent. larger than ours. In fact, nowhere in the world are freights transported so cheaply as in the United States, a statistical truth frequently heretofore stated by *The Tradesman*. Even the very low rate given in the table should be taken with reserve. We think it considerably above the average. Indeed, we are very certain it is too high for the through freight rates of the country as a whole. The enormous grain, flour, meat and other heavy provision trades between Chicago and New York is moved on rates that will not average above 50 cents per ton per 100 miles. The same is true of the freights on iron from East to West and from South to North, also on coal and many other heavy articles. It may be fairly doubted whether the average rates on through hauls in this country is more than $1.00 per ton per 100 miles.

This disparity in rates between this country, England and Continental Europe, existed when the difference was much greater in favor of the foreign roads on cost of iron and steel than it is now. American roads have always carried freights for half or less than half the English charge, though the roads in the latter country have been constructed of cheaper materials and with much cheaper labor; and they are operated by labor at about half American wages.

This would seem to make necessary a revision of the free trade theory, as its devotees apply it to this subject; but we shall not expect any such concession on their part. They cannot afford to drop any of their stock in trade in the campaign against protection, which is at the best, wofully small and weak.

The New Merchant Steel Association.

American Manufacturer, Pittsburgh.

There was held in this city, on Tuesday, Wednesday and Thursday of last week, a meeting of the manufacturers in the United States, of crucible and open-hearth merchant steel, every concern in the country being represented. The object of the meeting was the formation of an association of those engaged in this branch of the steel industry, which should have power to establish uniform prices and do other things for the benefit of the trade.

After a session lasting three days and part of two nights an association was formed and a list of prices adopted. The name selected for the association was the Merchant Steel Association of the United States, the officers of which are a chairman, a vice-chairman and a commissioner. The duty of the latter is to examine the books of the different firms to see if they live up to the rules of the association.

The immediate result of the formation of the association was an advance in prices. The base price of tool steel was raised from 7c. per pound to 8½c.; crucible spring steel from 3½c. to 4½c.; crucible machinery steel, from 4c. to 5c.; open-hearth machinery steel, from 2¼c. to 2¾c. Corresponding advances were made along the whole line of crucible and open-hearth steel used for agricultural and mechanical purposes. The classification agreed on was that adopted April 13, 1886, by the defunct association (Steel Association of the United States).

The association will hold another meeting within a few weeks, likely sometime in November, and probably in New York city.

The defunct association also embraced the manufacturers of Bessemer merchant steel, but the new association does not—only crucible and open-hearth. The Bessemer people, however, have promised to form an auxiliary association, adopt the same clasification, and fix corresponding, but, of course, lower prices. We do not know who the officers of the new association are. The chairman of the convention was Mr. J. W. Brown, of Hussey, Howe & Co., this city.

The Utilization of Waste Material.

The complete erasure of the word "waste" from the dictionaries, at all events in so far as it has any relation to industrial products, is, if not quite an accomplished fact, undoubtedly becoming more and more imminent; and we may thank the chemists of this generation for teaching us how to recover and utilize innumerable substances which, in their ignorance, our grandfathers threw away. Thirty years ago the manufacturers of iron, gas, and chemicals elsewhere neglected all but the prime objects of their industries, whereas to-day, on the system of taking care of the pennies and allowing the pounds to take care of themselves, competition has induced us to regard our legionary by-products as so many integral parts or branches of each enterprise. If the intelligent men who have gone before, and who were looked upon by their contemporaries as wise in their generation, could by any chance reappear among us, we might conduct them to our gas works, and with a certain pride explain the origin of our sulphate of ammonia, our aniline dyes, and our hundred other extracts from coal tar. From the contemplation of gas we could turn with them to some of our smelters and furnaces, and point to the mineral wool, the cement, the glassware, the pottery, the fire bricks, and the fertilizers, all derived from our furnace slags, and finally, entering a great chemical works, we should show them how the once devasting gases, so fatal to life and vegitation, are no longer sent free into the air, but are condensed and transformed into staple articles of trade, and how, by an ingenious and, to them, undreamt-of process, we extract the precious metals from our exhausted sulphur ores.

To their wondering questions: "How can these things be?" we might reply that all these marvels result from a modern and enlightened policy, which, in many countries, has fostered every species of research in every branch of science; encouraged great minds to ponder over and gradually unravel the mysteries of Nature, and stimulated a general thirsting for that knowledge, which, properly applied, must ever ameliorrte our condition in this "vale of tears." It is possible that in our own glorious land of plenty and to spare, the full force of the injunction, "gather up the fragments that nothing might be lost," has only yet been realized by the comparatively few, but, despite the exuberance of our natural resources, the signs of the times cast their long shadows before us, and it behooves us all to accept their warnings. Our progress has been enormous; but we must neglect no opportunities.—[Eng. and Min. Journal.

Nye and Natural Gas.

Bill Nye telegraphed from Pittsburgh to the New York *World* the following characteristic letter:

I came here last evening to compete, under the auspices of the Pittsburgh Press Club and Marquis of Queensberry rules, in a kind of natural gas tournament. I do not brag nor boast, but it strikes me I held my own for 60 minutes.

Gas here springs spontaneously from the bosom of earth, and immediately proceeds to take charge of the heating, lighting and manufacturing business. It is clean, smells better than the places where the streets have been torn up on Fifth avenue this summer, and burns readily when properly encouraged.

Pittsburgh is a busy place. It is located at the point where the Allegheny and Monongahela rivers fork. Nature has done much for Pittsburgh. She placed her in one of the busiest places in America and then gave her natural gas. This gas can be conducted into a room by means of pipes, and, by an automatic arrangement recently perfected, will, at any hour designated on an alarm clock, enter your room, scratch a match on its trousers and light your fire, so that you need not get up till the room is warm.

It cooks evenly, and, assisted by an intelligence office, will do almost anything but vote. I like natural gas. Artificial or assumed gas does not please me; but the gas that bubbles out of the bosom of the earth and just simply asks where it can get a job is what we have been looking for.

Artificial gas is superficial. It likes to look well in company and seem brilliant and attractive in society, but it is false at heart. It likes to seem refined and gentlemanly and polished and sincere, but rise and assert yourself and blow it out and see how quick it will take your life. Look the other way 10 minutes and see how soon it will slip down into your cellar and toy with your meter.

But natural gas comes out of the ground, spits on its hands and asks where there is anything to do. It then proceeds to do it. The young men of America will do well to emulate the natural and untutored gas of Pittsburgh. Do not seek to shine too much by night or attract attention by organizing a gas leak by day. Give less attention to the matter of adequate service and you will do well. Give your best endeavors to the promotion of your employer's interests, no matter what your salary may be, breathe through your nose, look up and press onward.

THE mechanical engineers are of the opinion that natural gas can be conducted much longer distances than it has yet been done by a system of exhaustion at the delivery end. To this end large machines are being built.

THE VALUE OF SPECIALTIES.

Col. H. W. Pinkney, in Lumber Worker.

If I were a young man starting out in the line of manufactures to make a name and competency, I would select some one article, study the possibility of working up a demand for it, carefully investigate the possibility of improving it, and then I'd pitch in with my coat off and win with it.

It doesn't make a great deal of difference what article a man makes so long as he makes it better than any one else does. A market will always be found for it, and its manufacture and sale will invariably yield a profit. No field is so full but that another may gain a foothold thereon. This foothold may be broad and firm, or it may be slippery and uncertain. Everything depends upon the man who is striving for it. I never knew a man who lost anything by hanging on to what he believed to be a good thing.

Nothing so inspires confidence in others as full confidence in yourself and your ability. I don't mean overweening confidence or aggressive confidence, but I do mean positive confidence. The man who says he can do a thing is believed in, unless some emergency arising to test his ability finds him lacking it.

No young man need cudgel his brains or lie awake nights to invent some new article of manufacture. Don't worry because you have no patents. Why, bless your soul, there's money in making wooden wheelbarrews. There are several factories in the country making them, to be sure; but you can crawl in among them if you feel like it, and have the necessary push and energy.

If I were making wheelbarrows, I'd make only the "Pinckney" wheelbarrow. It might not be one whit stronger than the "Smith" or "Jones" wheelbarrow; it may not run a bit lighter, or be capable of carrying a pound heavier load; but it should be in every way just as good as the "Smith" or "Jones," and in one or more respects it should differ from those two brands, and upon these differences I would build up its reputation, and create demand for it.

But, you may say, Smith and Jones may do exactly as I would. Very well. I've no serious objections. In other words, I must not expect to sell all the wheelbarrows, nor can I hope to convince everybody that the "Pinckney" wheelbarrows are the only ones worth buying, but I can convince a sufficient number of buyers that my wheelbarrows are sufficiently good to give me a very nice business, and if I show no "let-up" in pushing them I'll build up a big business.

The great advantage in the manufacture of specialties is that the buyer involuntarily associates the maker's name with the article. Take, for instances, shingle machinery. If you were about ready to purchase machinery of this nature, what name would suggest itself to you first? Undoubtedly "Perkins" of Grand Rapids, Mich. Why? Perkins & Co. make a specialty of that line of machinery, have carefully and persistently studied its possibilities and have continually improved it, and further have persistently advertised "Perkins" and "shingle machinery."

Apropos of "Perkins," I was told recently that when they made up their minds to work for the trade of shingle manufacturers they were laughed at and pitied, because while nobody doubted they could sell, nobody could discover how they were going to secure their pay.

In those days shingle manufacturers were not widely known as overburdened with commercial honor. However, Perkins & Co. "went in" for that trade and they got it. They demonstrated that improvement in shingle machinery could be made, and they made it. They went further and proved that competition with parties using their machines was practically impossible by others not so supplied. The result has been what? Simply this: Shingle makers had to have Perkins' machinery, and to get it they had to pay for it.

I don't know that for my purpose I could cite a better example than Perkins & Co., and I don't do it to puff them, as I never used any of their machinery, and never spoke a word to a member of the firm. They entered a field that at the time was deemed undesirable, and worked it up to a most profitable one, simply by keeping abreast with, or a little in advance of, the requirements of the trade they sought.

There are other manufacturers of shingle machinery in the country who do very large and very satisfactory business, but this does not effect, materially, the business done by Perkins & Co., and it will not until they, Perkins & Co., cease their efforts to increase the capacity and efficiency of their machines.

In the manufacture of specialties one has every opportunity to keep the cost of production down. He is in a position to determine just how much material goes in this part, etc. Furthermore, having the specialty, he gives it and its manufacture closer study. Can he devise a tool for more rapidly performing some of the work incident to its construction? He does it. Can its construction be simplified? He has ample opportunity to find out.

Another advantage a young man or firm has, who, starting in the manufacturing line, makes some article a specialty and builds a reputation upon it, is the fact that the reputation so gained will be of vast service to him some day in the future if it is deemed wise to increase the business by adding other articles to its line of business.

As I said before, it doesn't make much difference what you make, so that it is well made, well finished, well advertised, well pushed and capable of fully carrying out every representation you make for it. If one thinks the buying public is a "fool," let him try it in the manufacturing line, and he will not be long in discovering his error. If the article is good in every way, the buying public will very quickly discovery it, and willingly lend its maker full confidence.

TESTS OF IRON.

David Spence in American Machinist.

Since my article on cupolas I have received letters from foundrymen, asking me for the names of the iron used in getting such strong castings. For the benefit of your readers, I will give the result of several tests taken at our foundry recently:

Kind of Iron.	Test.
1.	
⅓ Minneapolis	No. 1 1150
⅓ No. 1 Rockwood	No. 2 1190
⅓ Machine scrap	
2.	
⅓ Minneapolis	No. 1 1320
⅓ No. 2 Rockwood	No. 2 1395
⅓ Machine scrap	
3.	
½ Minneapolis	No. 1 1265
¼ No. 2 Rockwood	No. 2 1460
¼ Machine scrap	
4.	
¼ Minneapolis	No. 1 1385
¼ No. 2 Appleton	No. 2 1380
¼ No. 1 Rockwood	
¼ Machine scrap	
5.	
⅓ National	No. 1 1480
⅓ No. 1 Rockwood	No. 2 1550
⅓ Machine scrap	
6.	
¼ No. 2 Appleton	No. 1 1340
¼ No. 1 Rockwood	No. 2 1550
¼ Minneapolis	
¼ Machine scrap	
7.	
⅓ No. 1 National	No. 1 1545
⅓ No. 1 Ohio Alice	No. 2 1640
⅓ Machine and Stove scrap	

Kind of Iron.	Test.
8.	
⅓ Minneapolis	No. 1 1325
⅓ Ohio Alice	No. 2 1550
⅓ Machine scrap and stove scrap	
9.	
1-6 No. 1 Shelby	No. 1 1225
1-6 No. 1 National	No. 2 1540
⅓ No. 1 Ohio Alice	
⅓ Machine scrap and plate	
10.	
⅓ National	No. 1 1375
1-6 Ohio Alice	No. 2 1425
1-6 No. 1 Shelby	
⅓ Mixed scrap	
11.	
1-6 No. 1 Rockwood	No. 1 1575
1-6 No. 1 Ohio Alice	No. 2 1650
1-6 No. 2 National	
1-6 No. 1 Appleton	
⅓ Mixed scrap	
12.	
No. 1 Appleton alone	No. 1 1305
13.	
Minneapolis alone	No. 1 1270
14.	
No. 1 Shelby alone	No. 1 1275
15.	
No. 2 Shelby alone	No. 1 1345

The test bar was 24 inches long and one inch square. For tests Nos. 12, 13, 14 and 15 the iron was melted in a crucible, so as to be able to get at the real strength of the iron.

The test No. 11 is the one that has given the best result of a mixture, and I am now using that mixture for our season's work. It is strong, and also soft, so that the smallest casting can be drilled.

The Rockwood is a Southern soft iron. The Ohio Alice is a good, strong soft iron. The National is a Lake Superior, hard, strong iron; so is the Appleton. The Minneapolis is from near Minneapolis. The Shelby is a Southern iron. In my experience I have found that the best results come from mixing different grades of iron together. But any person wanting a nice, clean iron, and soft, the No. 1 Rockwood is the best I ever have used. The Shelby is also a clean iron. Anyone wanting a good, soft iron, and also strong, the Ohio Alice is a good iron. Now, I do not give this in the interest of any iron company, because I am not acquainted with any of the men representing any of those companies. But I give it for the benefit of foundrymen who do not have the same chance of testing as I have. Mr. Masters and myself seem to be the only ones that keep a record of our iron, and give it for the benefit of others.

The Nos. 1 and 2 under test were, No. 1 the first taken from cupola, No. 2 the last.

In reply to a question which has just reached me I will say I refer in the above table to transverse strength, the distance between supports being 24 inches.

A STEAM ENGINE OF 1809.

Retained in perfect running order in the United States Steamboat Inspector's office at Louisville, Ky., says the Louisville Courier Journal, is an oscillating engine constructed in 1809 by Danial French. It is only of model size and is probably the first engine of the kind ever constructed. Its description is simple. Having its piston rod attached directly to the crank pin, as the crank revolves the cylinder oscillates upon trunnions, one on each side of it, through which the steam enters and leaves the steam chest. The valves are within the steam chest, oscillating with the cylinder. It is perhaps as satisfactory an engine of this class as has ever been built, for it is well known that the mechanism actuating the valves in oscillating steam engines has seldom proved perfectly satisfactory in its operation.

The inventor, whose son carried on a shipyard for years at Jeffersonville and was well known to many of the older citizens of the city, was contemporaneous with Robert Fulton, who built a steamboat on the Seine in 1803 with Chancellor Livingston, and who, in 1806, with Livingston, had a boat built on the Hudson, in which he placed machinery claimed to have been made by Boulton & Watt in England.

Daniel French had litigation with Fulton about this steamboat, claiming that the latter had appropriated his invention, but Fulton was backed by Livingston's influence and capital, and, though the case was before the courts for many years, in one form or another, French was finally defeated. Although the oscillating engine on exhibition in the Steamboat Inspector's office was not built until 1809, it was by no means the first attempt French had made to invent an engine applicable for steam navigation. He had been known as an inventor for a quarter of a century before, and his numerous inventions of different kinds had given him an extensive and esteemed reputation. Those who knew him were wont to say that he was half a century ahead of the time in which he lived.

It is not improbable that Fulton was familiar with French's experiments with steam. It is a historical fact that in connection with his profession as an engineer he had passed years in the scientific experiments, the result of which forever identified his name with steamboat navigation. It is not to be doubted, therefore, that he was acquainted with the efforts of every experimentor of the power of steam in this direction, from the time that Blanco de Garay is supposed to have actually applied steam to the propulsion of a ship at Barcelona, in the year 1543, up to the time when, in 1763, William Henry, of Chester County, Pa., tried his model steamboat on the Conestoga River. Fulton witnessed that experiment, and it is a matter of record that he was familiar with the work of the numerous contemporary inventors in America, and had visited England, where he found others at work on the same problem. But with this invention, as with all others, though the claimants may be numerous, the credit attaches to the one most successful in bringing it before the public.

Machinery in Germany.

A report dealing with the trade of Wurtemberg for 1886 states that the only makers of machinery who secured good returns were those who devoted themselves to the production of specialties of small dimensions. One firm of machine makers asserted that the prices of goods fell 44 per cent. during the last decade, whilst the rate of wages increased 30 per cent. in the same period.

Another firm at Berg, a suburb of Stuttgart, described the year as having been more unsatisfactory than 1885, as prices continued to decline, owing to over-production. Notwithstanding the customs dues, English makers were able to keep up an active competition in locomotives, steam engines and other machinery.

As far as agricultural implements were concerned, the protective duties of neighboring States, and especially Austria and Russia, prevented an export trade, and makers of this class of goods were forced to try and obtain a market at home, the result being that the supply was far in excess of the demand.—[Free Trade Paper.

A fine specimen of the blacksmith's art is the bouquet recently presented to the Iron Chancellor by the Bismarckshutte, the well-known Silesian rolling mills. It is manufactured entirely of the fine iron plate which is a specialty of the above works. The bouquet is nearly 30 inches high, is composed of elder flowers, buttercups, helio'ropes, forget-me-nots, etc., intermixed with fern leaves and maidenhair ferns, all exqusitely worked of fine wought iron, and surmounted by a branch of oak, surrounded by branches of laurel and olive.

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Industrial Notes

Blast Furnaces:—

Stack No. 8, of the Lock Ridge, Pa., furnaces of the Thomas Iron Company, has been blown in.

No. 2 Furnace, of the Stewart Iron Works, at Sharon, Pa., which has been undergoing repairs, will resume operations on the 15th inst.

No. 3 Furnace of the Crane Iron Company, at Catasauqua, Pa., was blown in last week after a thorough repairing. The above company have now five furnaces in successful operation.

The third blast furnace on Breaker Island, above Albany, N. Y., will be started as soon as the contractor, J. P. Witherow, of Pittsburgh, can supply the necessary boilers and pumps. This was decided on at a meeting held on the 28th ult.—[American Manufacturer.

A Duluth dispatch announces the discovery of an immense deposit of iron ore in township 63-11, Vermilion district. A vein 60 feet wide, the length of which has not yet been determined, is said to have been shown up. The property is owned by Detroit and Milwaukee parties, according to the report sent out.

The Colorado Coal and Iron Company are now building, and have almost completed, a line of railroad to their valuable coal properties up Rock creek, and intend to locate a hundred ovens on ground owned by them adjacent to Carbondale townsite, and it is an assured fact that a syndicate of capitalists are soon to locate extensive steel works and blast furnaces, having purchased forty acres of land north of the town for that purpose. These works, it is said, will cost not less than $200,000.

A special from Chattanooga says: "A wealthy Pennsylvania syndicate, represented by Charles Dougherty, member of Congress from the first district of Florida, has been quietly purchasing magnetic iron ore lands in Walker county, Ga., twelve miles from Chattanooga, and it has just leaked out this evening that they have already secured 20,000 acres and have options on several thousand more. A railroad will be built to Chattanooga, two furnaces erected and the property thoroughly doveloped. Experts have tested the magnetic ore, and it is superior to the ore of the Lake Superior region used for making Bessemer steel. There is great excitement in Walker county and land has advanced in price five-fold."

Steel Works:—

The new billet mill of the Pennsylvania Steel Works will soon be ready for operation.

The Union Steel Co., of Chicago, made 19,690 tons of rails during the month of October, in 47 turns, or an average of 419 tons per turn. This is one of the best, if not the best records of steel rail production known.—[Railroad Gazette.

The Johnson Steel Street Rail Company have decided to locate their new works on the Von Lunen farm, close to Johnstown, Pa., where they have 190 acres of land. They will erect furnaces and rolling mills in addition to their present works at Woolvale. The company will at once lay a railroad track from the new location to Johnstown.

It is stated that the Tennessee Coal, Iron and Railroad Company, and the Sloss Iron and Steel Company, of Birmingham, having bought the right to manufacture steel by the basic process of Jacob Reese, have selected sites at Ensley for mammoth steel works, and propose to begin work soon. Mr. Reese states that the American Basic Phosphate Company will build fertilizer works with a daily capacity of 300 tons.

An erroneous report is in circulation in the Western newspapers concerning the Indianapolis Rolling Mill. It is stated that $500,000 has been sunk in the endeavor to fit the mill to roll steel rails. S. W. Morgan, the secretary and superintendent of the company, informs us that while much trouble was experienced in getting the finishing mill to work satisfactorily, yet the breaks did not involve the loss of a fifth the amount named. When the trouble of this kind had been surmounted, orders became scarce, and the rail mill is now idle on that account and not because the rails made were of unsatisfactory quality. The steel-melting department is still at work.—[Iron Age.

Rolling Mills:—

The new puddling mill of the Chatasauqua Mfg. Company, at Ferndale, Pa., has been completed. The first iron was puddled in it on the 27th ult.

It is reported that Samuel Thomas, president Pioneer Mining and Manufacturing Co. of Birmingham, and J. H. Woodward will build a rolling mill soon near Oxmoor, Ala.

The difficulties of parties interested in the Oregon Iron and Steel Company at Oswego, Oregon, have been settled and work is to be resumed. The new furnace will be finished and a plant for making cast-iron pipe put in. The company owns 14,000 acres of timber land, upon which are extensive iron mines.

The rolling mill attached to the steam forge at New Albany, Ind., is completed. The company's first idea in building was to make muck bar for axles but they have put in trains of rolls for beams and angles, and a common bar mill. Everything is built on the most improved plan, and the heating furnaces will probably use manufactured gas.

Machine Shops:—

The Penobscot (Me.) Steam Boiler Co.'s works, recently destroyed by fire, will be built upon a much larger scale.

A company has been organized at McDonald, Pa., with a capital of $75,000, for the purpose of building a foundry and machine shop to manufacture the Edney coal mining machine.

The Merrill-Stevens Engineering Co., with a capital stock of $50,000, has been organized at Jacksonville, to build and sell machinery. A. D. Stevens is president; H. C. Pike, secretary, and W. L. Lumkin, treasurer.

George R. Lombard & Co., Augusta, Oregon, are enlarging their foundry, machine and boiler works by an addition 70x200 feet and one 50x150 feet, and are erecting a two-story building, 30x60x70 feet for storage purposes.

The St. Louis Boiler and Sheet Iron Works of Joseph F. Wangler have shipped two 48-inch by 18-foot steel boilers to Memphis, one 46-inch by 20-foot steel boiler to a point in this state, and an oil tank to Helena, Ark. Included in the work in hand and orders may be named two iron boilers, 60 inches by 16 feet, for Jefferson City, Mo.; a steel boiler, 48 inches by 20 feet, for Colorado; another of similar dimensions for this state; two of the same for Illinois; large soap kettle for the City of Mexico.—[Age of Steel.

Sebastian, May & Co. of Cincinnati, manufacturers of lathes, etc., report business very good. Orders are coming in very rapidly for their lathes. They have recently furnished the Cincinnati Technical School with a dozen lathes and have just booked their second order from the same school. They have also furnished a lot of their lathes to the Washington, D. C., public schools, also a lot to the Sworthmore College in Pennsylvania, and to the Manual Training School of Philadelphia. These are only a few of the many schools and colleges that are now using their lathes and they all pronounce them highly satisfactory. This firm have recently moved into their new building and have increased their facilities so that they are now enabled to turn out work very rapidly and give their orders prompt and careful attention.

Foundries:—

The Leeds Land and Manufacturing Co. propose to build a foundry at Leeds, Ala.

Beggs Bros. & Co., Birmingham, Ala., will shortly erect a new and larger iron foundry.

The Rood & Brown Car Wheel Works, of Buffalo, have added three extra cranes and ten annealing bits, which will increase their capacity 200 wheels a day.

The Decatur (Ala.) Car Wheel and Car Spring Company was organized last week with E. Stanley Mitchell, of Milwaukee, president; R. M. McCullough, secretary and treasurer, and Ed. P. Fitzpatrick, vice-president.

A contract for cast-iron water-pipe for the town of Lake, a suburb of Chicago, was awarded last week to the Shinkle, Harris & Howard Iron Company, of St. Louis. The terms are $29.74 per ton of 2,000 pounds of 24-inch pipe, to be delivered as fast as required by the board. The length of pipe needed is about 27,000 feet and it will cost $95,000.

The buildings of the East Buffalo (N. Y.) Iron Works will be completed before the first of January. The main building will be 80x325 feet; machinery building, 50x150; cupola building, 35x52; and boiler house, 40x82. A 28 foot crane in the main building will enable the company to handle the largest castings. Nearly everything in the way of cast-iron will be made at these works.

Work on the Government Gun Foundry building, on the Watervliet, N. Y. Arsenal grounds, is progressing rapidly and most satisfactorily. The machine shops, two ample structures, 130 feet long each, are finished, with the exception of putting in heating apparatus. The buildings are to be heated by circulating pipes, and bids for doing the work were opened yesterday. The monster lathe has been placed in position with other machinery, and a new consignment has been received from Pittsburgh.

Hardware:—

The nail factory of P. L. Kimberly & Co., at Sharon, Pa., which has been idle for some time, resumed operations on Wednesday, the 26th ult.

A. M. Fletcher, George F. Branham and J. Hendricks, all of Indianapolis, are making inquiry preparatory to placing an order for over $100,000 worth of wrought iron pipe, to be used in piping natural gas.

The Sharon Iron Company, of Sharon, Pa., are experimenting with a machine capable of making either cut or wire nails. It produces diamond-pointed cut nails, and it is asserted that cut nail machines can be readily changed at a slight cost to produce wire nails.

The Lenz Wire Nail Company, of Belleville, Ill., have had their plant of ten machines in operation less than three months, but have met with a demand which makes enlargement necessary, and they have determined to give up their rented shop and power and erect new works with much larger capacity as soon as possible.

The Chattanooga Tool Company, Chattanooga, Tenn., have purchased the outfit, patents and good will of the Lorain Tool Works of Lorain, Ohio, and have removed the plant to Chattanooga. They have now completed their works at that place, and have added new machinery and greatly enlarged their capacity, so that they are in a position to fill orders promptly. They state that they are sole manufacturers of the Champion and Southern Queen hoes, Jacobs' patent neck yokes. Defiance drain shovels, Howe's socket mallets, and combination garden tools. They are also manufacturers of planters' hoes, forks, rakes and some hardware specialties. Business is referred to as promising, some large orders having recently been booked.

Miscellaneous:—

The capital stock of the Elm City Iron Works, at Marion, S. C., has been largely increased, and their capacity will be doubled. Agricultural machinery of all kinds, engines, etc., will be manufactured.

The Western Forge and Tool Works made an assignment last Saturday to R. W. Cruttenden, for the benefit of creditors. The assets are about $12,000, and the debts—due in greater part to creditors in St. Louis, Cincinnati, Louisville, Boston, Buffalo, Hartford, Conn., and Sedalia, Mo.—probably do not exceed that amount. The Company was composed of J. H. Wyeth, psesident, J. W. Williams, vice-president and manager, and A. R. Moore, secretary and treasurer. It had a capital stock of $20,000, four-fifths paid in.—[Age of Steel.

Boring Nearly a Mile for Coal.

The deepest bore-hole in the world is at Schladebach, near Kotschau station, on the railway between Corbetha and Leipsic, and has been undertaken by the Prussian Government in search for coal. The apparatus used is a diamond drill, down the hollow shaft of which water is forced, rising again to the surface outside the shaft of the drill, and inside the tube in which the drill works. By this method cores of about 50 feet in length have been obtained. The average length bored in 24 hours is from 20 to 33 feet, but under favorable circumstances as much as 180 feet has been bored in that time. Other deep holes are as follows: Domnitz, near Wettin, 3,237 feet; Probat-Jesar, Mecklenburg, 3,957 feet; Sperenberg, near Zossen, 4,173 feet; Unseburg, near Strassfurt, 4,242 feet; Lieth-Elmshorn, Holstein, 4,390 feet; Schladebach, 4,515 feet.

The dimensions of the bore-hole at Schladeback are as follows:

Total depth, ft.	Depth, ft.	Diameter, in.
189 6	186.6	11.0
6(6.7	416.1	9.0
661.8	56.1	7.3
1.996.5	1,214 7	4.7
2 259 8	3(3.3	3.6
3.5 3 4	1,283.6	2.8
4 (69.9	526.5	1 97
4.514.6	444.7	1.88

The various strata passed through are as follows: Soil and sand, about 16 feet; clay, 66 feet; sandstone (bunter) 459 feet; anhydrite, 59 feet; magnesian limestone, (zechstein) 144 feet; gypsum, 36 feet; anhydrite, 295 feet; Marl-slate (Kupfersheifer) 3 feet; sandstone (rothliegendes) 3,435 feet.

The bore-hole, which in January, 1885, had reached a depth of 4,600 feet, was commenced in June, 1880, but left after a year's work, re-commenced at the end of 1882, and is still progressing. The cost up to January, 1885, was about £5,000.—[Stationary Engineer.

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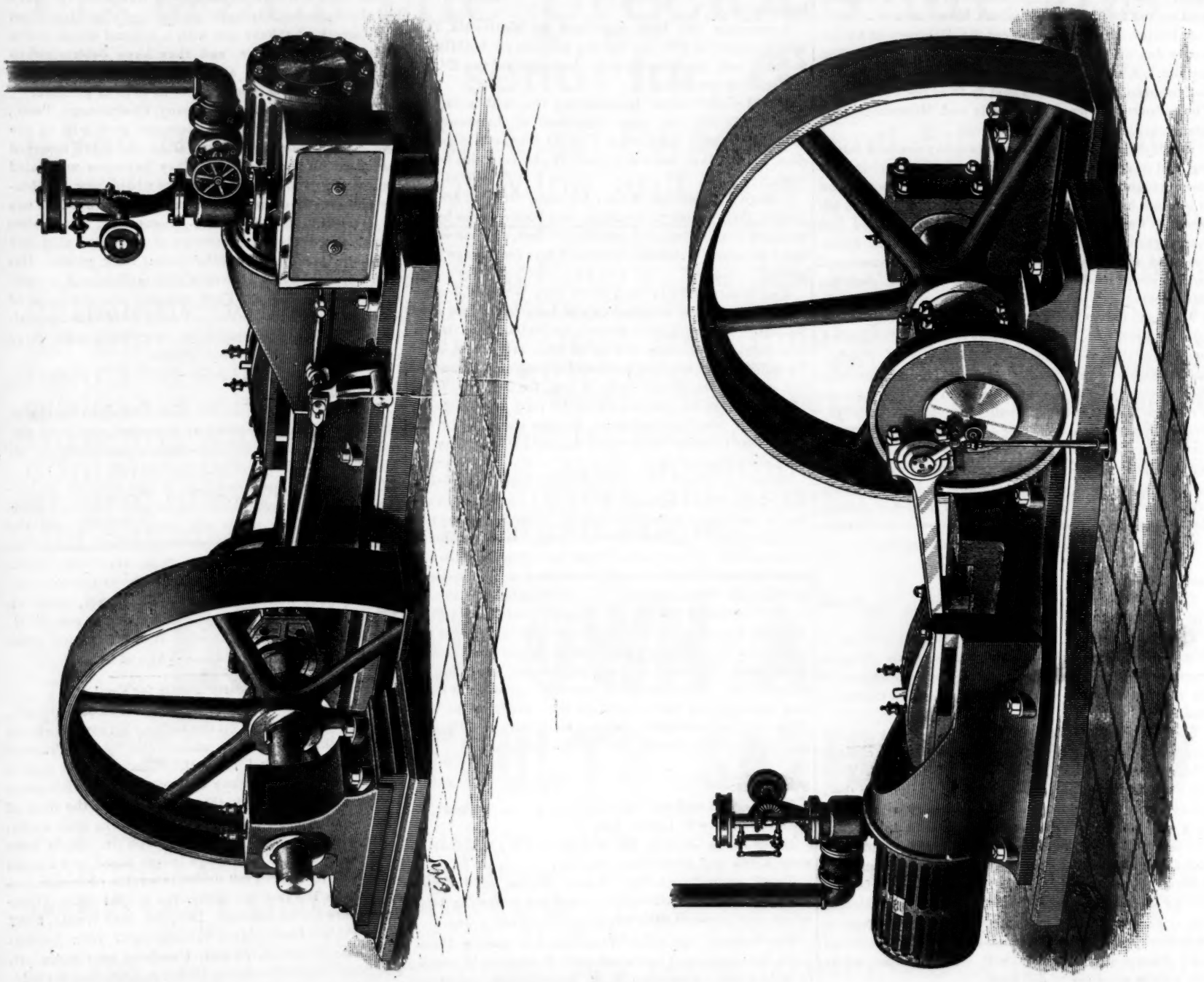

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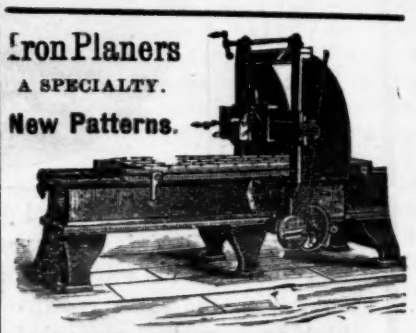

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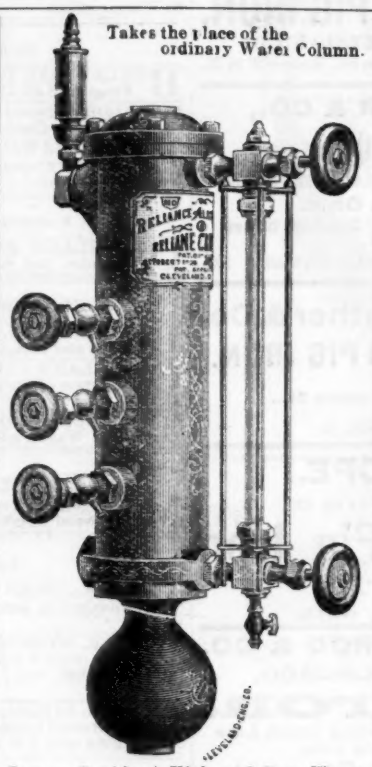

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It is our ultimate object to deal wholly with the trade, which includes **Boilermakers, Engine Builders and Steam Fitters,** as well as general dealers, with all of whom we are ready to co operate, but we cannot afford to lose any opportunity to place these Safeguards in new territory, as columns in operation are our best advertisements. We therefore trust that all steam users who have not been approached on the subject will write us and take advantage of the special inducements we are offering to get them introduced.

The trade everywhere can handle these Safeguards with satisfaction and profit, and without risk, as they supply an actual need, and we support all dealers in guaranteeing satisfaction. The harvest time is at hand, as boilers are now being placed in establishments built during the past summer.

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MARKET REVIEW.

OFFICE OF IRON TRADE REVIEW.

CLEVELAND, O., FRIDAY EVENING, November 11, 1887.

Iron Ore.

The receipts for the week were about 32,000 tons, and the shipments 31,500 tons. The sales were limited, being confined to a few small lots of non-Bessemer Hematites, at figures said to be below $5.50. Despite the rough weather on the lakes the ore contracted for by the furnacemen is being hurried down with all possible rapidity. There have been practically no charters during the week, vessels having left on their last trip for the season. Vessel men still refuse to make any concessions whatever for next season, although ore men everywhere say that freights will be forced down 50 per cent. by the advent of new ships and the consequent demoralization of the vessel owners' pool. Nearly all the mines are now shut down. Careful estimates of the business done during the past week by local dealers place the sales at 4,500 tons. Of this amount about 3,000 tons were non-Bessemer. We quote without change:

No. 1 Specular and magnetic Bessemer ores per ton	$7 00@7 50
No. 1 Specular (non-Bessemer) ores per ton	6 00@6 55
Bessemer Hematites	5 75@6 70
Non-Bessemer Hematites	5 00@5 00

Pig Iron.

There has been considerable inquiry for iron for future delivery during the past seven days, a feature that distinguishes the week for a dozen preceding ones. Furnacemen seemed to have given up their fight among themselves, and there is a uniformity in asking prices that is refreshing. The inquiries during the week have been principally confined to silvery and gray forge irons, and for No. 1 foundry; a sale of the latter brand to be delivered in Cleveland in four months is said to have occurred at $20.85, the iron being "cinder mixed." The actual business of the week has not been heavy, furnacemen having so very little iron for sale. Despite a weekly output of 20,000 tons, many of the furnacemen have orders sufficient on hand to keep them engaged until May, while others will certainly be kept busy until April. The sale of a considerable quantity of Southern iron is reported. There is some talk of several very large orders to be placed soon. Until these have been effected no important change in prices is possible. We quote f. o. b. cars, Cleveland, four months:

CHARCOAL PIG IRON.

Nos. 1 and 2 Lake Superior charcoal	$21 50@22 00
Nos. 3 and 4 Lake Superior	21 50@22 00
Nos. 5 and 6 Lake Superior	21 50@22 00

BITUMINOUS AND COKE IRON.

No. 1 Bessemer	$ 21 85
No. 1 foundry, all lake ores	21 35@21 85
No. 2 same	20 35@20 85
No. 1 foundry, lake ores, with cinder mixture	20 85@21 35
No. 2 same	19 85@20 85
No. 1 silvery, native Ohio ores	21 00@21 50
No. 2 same	20 00@20 50
No. 1 gray forge, red short	20 35@20 85
No. 1 gray forge, neutral	18 85@19 35
No. 1 American Scotch (Black Band)	21 53
No. 2 American Scotch "	20 53

Manufactured Iron.

The demand for bars is better although prices do not improve. Sales have taken place at $1.90 and concessions are even offered at these figures if the order is at all large. Sheets are eagerly taken at $3.10 for No. 24 and $3.35 for No. 27.

Scrap Iron.

We hear of the sale of a small lot of old wheels at $21.-25. For old American $26 is asked while $25.25 would be nearer the selling price. The market is improved.

CINCINNATI PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Rogers, Brown & Co.

The past few days have developed the fact that not less than 37,000 tons of Southern coke iron have been bought in the North in the past two weeks. Three-fourths of this was taken by pipe works at Newport, Louisville and St. Louis, and is for No. 1 and No. 2 mill almost entirely. About 4,000 tons foundry grades were sold by one company at Eastern seaboard points where the prices realized net something better than Western prices. These sales practicallly put two or three of the largest companies out of the market on mill iron grades until next Spring. It has invariably happened in the past that a heavy, concerted buying by large pipe makers has been followed by a period of activity through the Western market, and sellers look for the same result now. The prices of these transactions (the deliveries of which run nearly through next year) are understood to be a little under minimum quotations below. Having placed so large a quantity, the companies are disposed to hold firmer and an arrest of the decline if not a re-action in prices is the result. Taking the whole market together, a distinctively better feeling is noticeable. The rank and file of buyers, however, still understand that iron is declining and delay purchases to the last. We quote (Nov. 7):

HOT BLAST FOUNDRY IRON.—Ohio and Southern Strong Coke, No. 1, $20 50@$21 00, Ohio and Southern Strong Coke, No. 2, $20 00@$20 00; Ohio and Southern Strong Coke, No. 3, $19 00@$19 50; Ohio Soft Stonecoal, No. 1, $20 50@$21 50, Ohio Soft Stonecoal No. 2, $19 50@$20 00; Mahoning and Shenango Valley coke, No. 1, $21 50@$22 00. CHARCOAL IRON.—Hanging Rock, No. 1, $23 00@$25 00; Hanging Rock No. 2, $22 00@$23 00; Tennessee and Alabama, No. 1, $21 50@$22 00; Tennessee and Alabama, No. 2, $20 50@$21 00. FORGE—Strong Neutral Coke, $17 75@$18 50; Mottled Coke, $16 00@$16 50; Cold Short, $17 00@$17 50. CAR WHEEL AND MALLEABLE—Southern Car Wheel Iron, $24 50@$26 00; Hanging Rock Cold Blast, No. 1, $25 00@$28 00; Lake Superior Malleable, $24 50@$25 50.

CHICAGO PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Rogers, Brown & Co., W. W. Backman, Resident Agent.

The principal event in iron circles here the past week was the meeting, on the 3d inst., of the makers of charcoal iron. It was an adjourned meeting from the gathering at Detroit. The constitution was changed so as to limit the Association to Lake Superior charcoal iron makers, and the name changed to correspond. About half of the producers in the district were present or represented. Demand for iron has been better during the week, but the buying has been mostly in small lots. It is safe to say that never in the history of the trade have dealers entered so many orders in number, as they are now doing. Prices have shaded down a trifle, except for No. 1 Ohio softeners, which are still scarce and in rather urgent demand. We quote for cash f. o. b. cars Chicago (November 5):

Coke and Coal Foundry:—Ohio Hanging Rock softeners, No. 1, $22 00@22 50; Ohio Jackson county, softeners, No. 1, $22 00@22 50; Ohio, Black Band softeners, No. 1, $22 50@23 00; Lake Ore and Cinder softeners, No. 1, $21 00@22 00; Southern coke foundry No. 2, $21 25@21 75; Southern coke foundry No. 2½, $20 75@21 25; Southern coke foundry No. 3, $19 75@20 25. Old Materials:—Old American Rails, $24 50@25 00; Old wheels, $20 50@21 50. Charcoal Foundry:—Lake Superior, $22 25@23 25; Southern, $22 50@23 50; Hanging Rock, $24 50@25 50. Car Wheel and Malleable:—Lake Superior, $22 25@23 25; Standard Southern, $24 50@27 50; Hanging Rock Cold Blast, $27 00@28 50; Hanging Rock Warm Blast, $24 50@25 50.

LOUISVILLE PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Geo. H. Hull & Co.

The market for pig iron continues in an unsettled condition. Some speculative lots have been sold at concessions, while the iron actually in demand has brought outside figures. Some buyers have found on asking, that the figures were so much above their views that they are holding off purchasing. The product of most of the furnaces between now and January is provided for by future delivery sales. Any of the buyers that are expecting iron by river will run short unless there is a rise in the river soon, and there is very little prospect of their being able to purchase iron to come by rail, the railroad furnaces being sold up out of stocks. We quote for cash as follows (Nov. 8):

PIG IRON.—Southern Coke, No. 1, Foundry, $20 50@$21 00; Southern Coke, No. 2, Foundry, $19 50@$20 00; Southern Coke, No. 2½, Foundry, $18 50@$19 50; Hanging Rock Coke, No. 1, Foundry, $20 00@$21 00; Hanging Rock Charcoal, No. 1, Foundry, $23 00@$24 50; Southern Charcoal, No. 1, Foundry, $21 00@22 00; Silver Grey, different grades, $17 50@$19 00; Southern Coke, No. 1, Mill Neutral, $17 50@$18 50, Southern Coke, No. 2, Mill, Neutral, $17 00@$18 00; Southern Coke, No. 1, Mill, Cold short, $17 00@$18 00; Southern Charcoal, No. 1, Mill, $0000@$00 00; White and Mottled, different grades, $15 00@$16 00; Southern Car Wheel, Standard Brands, $24 00@$25 00; Southern Car Wheel, other brands, $22 00@$24 00; Hanging Rock, Cold Blast, $24 50@$26 00; Hanging Rock, Warm Blast, $21 00@$22 50.

DETROIT PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Charles Himrod & Co.

Although the inquiry during the past week has been considerable and although some orders have been placed, business has fallen quite below the usual amount. Small quantities of iron are called for and almost always for the very promptest delivery, and from distant points, particularly the South, prompt delivery is very hard to obtain, owing to the great scarcity of cars. The market is fairly steady, not more. Some concessions are made on foundry irons and we have learned of one sale of Lake Superior charcoal at considerably under ruling figures. The market for the latter grade of iron, however, we think is stronger, comparatively, than the others. November and December usually are the dullest months of the year and no large trade is looked for at this time. We repeat quotations of last week, as follows (Nov. 9):

Lake Superior Charcoal, all Nos. $22 00@$23 00; Lake Superior Coke, all ore, $22 00@$23 00; Lake Superior Coke, cinder mixed, $21 00@$22 00; Standard Ohio Blackband, $22 00@$23 00; Southern No. 2, $21 00@$22 00; Southern Silvery, open, $20 50@21 50; Jackson County (Ohio) Silvery $22 00@22 50; American old iron rails, $24 00@25 50; Old Wheels $20 50@21 50.

ST. LOUIS PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Rogers, Brown & Co.

The large orders booked by the Southern furnaces within the past two weeks have had a tendency to stiffen prices to some extent. Southern furnaces with hardly an exception are behind on their orders for No. 2 foundry, and Ohio softeners for delivery within the next 30 days are extremely scarce. The market taken as a whole looks better than at any time within the past three weeks, and the prospects are that we will have a good active trade for some months to come. We quote (Nov. 5):

Charcoal Foundry Irons.—Missouri, $20 00@21 00; Southern, $21 00@$22 00. Coal and Coke Irons.—Southern, $20 50@21 75, Ohio Softeners, $21 50@23 00. Mill Irons—Missouri, $19 00@19 50; Southern No 1, $18 00@19 00. Car Wheel & Malleable Irons—Southern, $24 00@27 00; Lake Superior, $23 00@24 00; Connellsville Coke, East St. Louis, $6 15.

CHATTANOOGA PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by Lowe & Tucker.

Business is as fresh as ever, and everybody seems desirous of improving the present fine weather. Building was never as brisk as it is at the present time, in almost all sections in the South, and as a consequence all building material is in very heavy demand. Cotton is now moving in large quantities, and the railroad lines are of course overstocked as usual. There is no diminution in the demand for pig iron, and prices are being well maintained notwithstanding rumors of decline in other sections. The fact is, the furnaces are under contract for nearly all their output for some months to come, which makes them quite easy as to the future. We quote No. 1 $18.50 and No. 2 $17.50 on a basis of 60 days.

PITTSBURGH PIG IRON MARKET.

Reported for the IRON TRADE REVIEW by A. H. Childs.

The metal market is still very dull with no indications of any improvement. Consumers are buying only in small parcels in the belief that the decline has not yet reached its limit, although it is well known that no reduction in the cost of pig iron has yet been secured. Quotations are nominally unchanged, but holders are not very firm and it is said that some are offering concessions privately. Quotations are (Nov. 7):

PIG IRON.—No. 1 Foundry, $20.00@$20.50; No. 2 Foundry, $19.00@$19.50; White and Mottled, $17.00@$17.50; Gray Forge, $17.75@18 25; Warm Blast Charcoal, $22.00@$24.00; Cold Blast Charcoal, $24.00@28.00; Bessemer, $20.50@21 00, four months.

STEEL-MAKING EXTRAORDINARY.

The Union Steel Company, of Chicago, says this week's *Iron Age*, have put themselves fairly in the front by their brilliant record for the month of October. With only two converters, running but 47 turns, they made 23,161 gross tons of Bessemer steel ingots, 21,555 tons of blooms and 19,690 tons of steel rails. The steel used in making these rails was exclusively their own product, no foreign blooms being used. There was also no accumulation of steel at the beginning of the month. On the last night of the month they made 2,075 rails, or 555 gross tons, which is the largest production ever made in a single turn. It must also be noted that they have but one rail mill. The aggregate rail production of the month was 76,429 rails, of which 68,124 were rolled direct from the soaking pits and only 8,305 were rolled from re-heated blooms. The record made during the first week of November was fully up to the results accomplished in October, showing that the plant is under excellent control and that the good work reported is not merely a spurt. The officers of the company are highly gratified at the proud position attained by their works, and have shown their appreciation of the diligence and faithfulness of the managers of the several departments under whom this has been done by presenting them with suitable testimonials.

The South Chicago furnaces of the North Chicago Rolling Mill Company have again made an exceptional month's record, their products and coke consumption being as follows:

No.	Product gross tons.	Coke consumption, pounds, per ton of iron.
5	6,363	1,798
6	5,995	1,848
7	5,783	1,910
8	5,298	1,871
Total	23,690	Av'ge. 1,855

These are results unrivaled anywhere else, even considering the fact that rich ores and good coke are available. Those who have contributed toward making them possible may well be proud of the achievement.

LIST OF PATENTS.

Relating to Iron, Steel, Metal, Machinery, Hardware and Mining Interests.

Reported expressly for this paper by H. T. Fisher, (late Ex. U. S. Patent Office), Patent Attorney, 34 Blackstone Building, Cleveland, O.

BEARING DATE NOVEMBER 8, 1887.

Amalgamator, B. Tyson, Washington, D. C.
Bagasse furnace, F. Cook, New Orleans, La.
Belt, link-driving, J. K. Tullis, Glasgow, Scotland.
Blast furnace, gas, J. H. Hillman, Pittsburgh, Pa.
Bolt-cutter, G. S. Lonnon and F. Mallett, South Pueblo, Col.
Foundry patterns, making, H. A. Garvey, Scranton, Pa.
Furnace, C. H. Bicalky, Minneapolis, Minn.
Furnace, R. Steel, Philadelphia, Pa.
Gas-furnace, C. V. Henry, Pittsburgh, Pa.
Metal-grinding machine, A. A. Weimer, Lebannon, Pa.
Railway-tie, metallic, C. Netter, New York, N. Y.
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Sanderson Bros. Steel Co.
CAST STEEL.

Jos. Corns & Son,
CROWN STAY BOLT IRON.

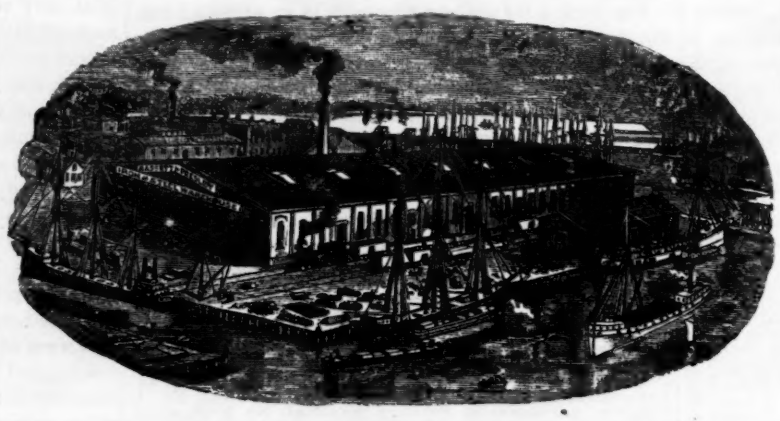
Pencoyd Iron Works,
ANGLE, T AND CHANNEL IRONS

Dilworth, Porter & Co.,
RAILROAD AND BOLT SPIKE.

Spang Steel & Iron Co.,
BOILER AND SHIP PLATES.

Spaulding Iron Co.,
STEEL NAILS.

Warehouse and Office,



Cor. Elm and Hemlock Sts.

Andrews Bros & Co.,
BAR IRON AND POLISHED SHAFTING.

Reading Iron Works,
BOILER TUBES.

Central Iron Works,
BOILER PLATES.

Geo. W. Johnson,
TANK AND SHEET IRON.

Hoopes & Townsend,
KEYSTONE BOILER RIVETS.

Lindsay & McCutcheon,
HOOP AND BAND IRON.

We Always Carry a Full Stock of All goods in Our Line.

All Correspondence and Telegrams Answered Promptly.

Prices Cheerfully Given on Application.

WE SOLICIT YOUR TRADE.

BASSETT & PRESLEY,

CLEVELAND, OHIO.

CLEVELAND WHOLESALE PRICES.

HARDWARE.

Anvils. per lb.

American.....10cts dis 20@20&5
Wrights.....10c

Anvil Vise and Drill.

Millers Falls Co. $18.....dis 20
Cheney Anvil and Vise.....dis 25

Augers and Bits.

Common augers and bits.....dis 60&10
Snells.....dis 60&5
Cook's Douglass Mfg. Co.....dis 55
Russell Jennings' augers and bits.....dis 25
Expansive Bits, Clark's small. $18; large, $26.....25
Hollow Augers, Ives'.....dis 25&10
Hollow Augers, Bonney's Adjust. ₱ doz. $48.....dis 40&10
Hollow Augers, Stearns' Adjust. ₱ doz.. $48.....dis 20&10
Gimlet bits.....per gross $4 50
Standard Bit Stock Drills.....dis 50&10&10
Ship Augers.....dis 15@15&10

Awl Hafts.

Sewing, brass ferrule,'.....₱ gross $3.50, dis 45
Patent sewing, short.....₱ doz $1.00, dis 40&10
Patent sewing, long.....$1.20 ₱doz net
Patent peg, plain top, ...$10.00 ₱ gro., dis 45
Pat. peg, leather top, ...$12.00 ₱ gro., dis 45

Awls, Brad Sets, &c.

Awls, Sewing, Common.....₱ gross $1.75—dis 45
Awls, Shouldered Peg ₱ gross.....$1.00—dis 45
Awls, Patent Peg.....₱ gross 75c—dis 45
Awls, Shouldered Brad.....$3.00—dis 10
Awls handled brad.....$7.80—dis 30
Awls handled. scratch.....$7.50 ₱ gro dis 35&10
Awls, socket scratch.....$1.50 ₱ doz dis 25
Brad Sets. No. 42, $10.50; No. 45. $12.50.....dis 60
Brad Sets, Stanley's Excelsior, No, 1. $7.50.....dis 30

Axes.

Makers' and Special Brands—
First quality.....₱doz. $7 00
Others.....₱doz. $5 75@$6
Full polished.....$8 00

Axle Grease.

Frazier's, in bulk.....keg ₱lb 4c; pail 5c net
Frazier's, per gross.....$9.50

Bag Holders.

Sprengle's pat., ₱ doz $18.....dis 60

Balances.

Spring balances.....dis 45
Common 24lb.....₱doz $1.50 dis 50

Bells.

Hand. light Brass.....dis 70
Hand. White Metal.....dis 60
Hand, Silver Chime.....dis 25&10&5
Hand, Globe (Cope's Patent).....dis 25&10@35
Gong, Abbe's.....dis 25&10
Gong. Nichols.....dis 40
Gong, Barton's.....dis 40&10
Cow, western.....Sargent's List 70
Call.....dis 33⅓
Farm bells.....dis 70
Steel alloy, church and school.....dis 40

Bellows. Discount.

Blacksmith's..50&10 &5 { Hill's.....40 / Bullock's.....50 &10
Moulders, ...discount 40
Hand. .....discount 40

Belting, Rubber.

Boston Belting Co.'s standard.....dis 70&70
" " " extra.....dis 50&10
" " " best.....dis 40
Cleveland Rubber Co., extra standard...dis 60&10
Shultz Raw Hide Leather Belting, single, dis 30
" " " " double, dis 35
Standard, oak tanned.....dis 50
Alexander Brothers' Pure Oak Tanned—
New list Oct. 1st, 1887, less.....33⅓

Bench Stops.

Hotchkiss's ₱ doz $5.00.....dis 10
Weston's ₱ doz No. 1, $10.00; No. 2, $9 dis 25&10&5
Morrill's.....₱ doz $7.50 dis 25

Bit Holders.

Extension, Barber's.....₱ doz $15 00, dis 25
Diagonal.....₱doz $24.00 dis 40
Angular.....₱ doz $24 00, dis 40

Blind Staples.

Barbed ¼ inch and larger.....₱ lb8@8½c net
Barbed ⅜ inch.....₱ lb 9@9½c net

Bolts.

Cast iron barrel bolts.....70
Cast Iron shutter bolts, etc.....70
Cast iron chain bolts.....65
Ives patent door bolts.....55
Wr't iron barrel bolts.....70
Wrought iron square bolts.....70
Wrought shutter bolts.....60

Sargent's list

Carriage com. new list.....70&10
Tire, common, new list.....65&10
Carriage and tire, Philadelphia pattern.....75&10
Stove bolts.....60
Plow bolts.....50
Machine.....70
Ends.....dis 70

Blind Fasteners.

Van Sand's Screw Pattern $15 ₱ gross—dis 60&10
Van Sand's Old Pattern.....$15 ₱ gross—dis 50&10
Automatic for wood.....$10.50 { " " brick.....$15.50 } 20

Borax.

₱ lb.....9c

Boring Machines.

Without augers.	Upright	Angular
Snell's. Rice's patent	5 50	6 75 dis 40&10
Lawrence	5 50	6.75 dis 45@45&10
Other machines	2 35	2 75 net
Phillips, with augers	6 00	7 00, 25

Braces.

Barber's.....discount 50
Spoffard's Patent.....discount 50@50&10
Bartholomew's Nos. 25, 27, 30.....dis 50&10
Bartholomew's Nos. 117. 118, 119.....dis 70
Amidon's corner brace.....dis 40@40&10
Pecks.....dis 60

Brackets.

Shelf, plain, Sargent's list.....55&10
Fancy " " .....dis 60&10
Reading, plain.....dis 55&10
Reading, rosette.....dis 60&10

Bright Wire Goods.

Regular List.....75&10@75&10&5

Broilers.—Henis' self basting.

Inch	9	10	9x11
Per doz	$4 50	5 50	6 50

Buckets, Galvanized.

Iron clad 10 qt $2 75; 12 qt $3 00; 14 qt $3 75

Bull Rings.

Humason, Beckley & Co.'s.....dis 70&10
Peck, Stow & W. Co.'s.....dis 50&10
Ellrich Hardware Co., white metal low list dis 50 @50&10

Butts. Discount

Wrought brass.....75&10@80
Cast brass, loose joint.....33⅓&10to33⅓&10&10
Cast Iron—
Fast joint, narrow.....50&10&5
Fast joint, broad.....55&10&5
Loose joint.....66⅔&10&5
Loose joint, jap.....66⅔&10&5
Loose joint, jap. with acorns.....66⅔&10&5
Loose pin, acorns.....66⅔&10&5
Loose pin. japanned acorns.....66⅔&10&5
Loose pin.acorns.japanned, plated tips 66⅔&10&5
Wrought steel—
Wrought, fast joint narrow.....65&10
Wrought. fast joint broad.....65&10
Wro't loose joint broad.....65&10
Table Butts. back flaps, etc.....65&10
Regular inside blind.....65&10
Light inside blind.....65&10
Loose pin.....65&10
Light loose pin.....65&10

@ 70

Can Openers.

Sprague No. 1 $2.00. 2 $2.25, 3 $2.50,.....dis 50&10
Star.....$4 00 net
Domestic.....₱ doz $2 50, dis 45
National.....$1 25, dis 45

Caps—Percussion, ₱ 1000.

Hicks & Goldmark's
F. L. Waterproof. 1-10's.....50c
E. B. Trimmed Edge, 1-10's.....65c
E. B. Ground Edge, Cent. Fire, 1-10's 70c
Double Waterproof. 1-10's.....1.40
Musket Waterproof, 1-10's.....54c
G. D.....30

dis 25

Elys waterproof central fire.....$1.60
Elys E. B.....56c

Cartridges.

Rim fire.....discount 60&2
Pistol and rifle.....discount 40&2
Military and sporting.....discount 30&2

Carpet Stretchers.

Cast steel, polished.....₱ doz $3.25
Cast iron, steel points.....per doz 80c
Sockets.....₱ doz $1 75
Bullard's.....dis 25

Cattle Leaders.

Humason, Beckley & Co.'s.....dis 75
Sargent's.....dis 66⅔&10
Peck, Stow & W. Co.....dis 50&10

Carpet Sweepers.

Queen.....₱ doz $16.00
Mystic.....₱ doz $16
Cottage.....₱ doz $15
Queen. with band.....₱ doz $18
King.....₱ doz $30
Garland.....₱ doz $18

Cards.

Horse and Curry.....dis 10

Casters.

Bed, Plate.....dis 50&10@60&5
Shallow Socket.....
Deep Socket.....dis 40&10
Yale Casters. list May, 1884.....dis 30 &10@40
Martin's patent.....dis 45&10

Chains.

Trace. 6½-10-2.....₱ pair 1.03
Trace, 6½-10-3.....₱ pair 92c } dis 50&5@50&10
Trace. 7-10-2.....₱ pair 1.11
German Halter Chain, list June, 1884.....dis 55
German Coil. list of June, 1881.....dis 55
Galvanized Pump Chain.....₱ lb 5½ to 5¾
Jack Chain, Iron.....75&10@75&10&5
Jack Chain, Brass.....dis 75@75&10

Chalk.

White.....₱ gross 55c
White Crayon.....₱gross 12@12½
Red.....75c
Blue.....85c

Chisels.

Socket Framing. and Frmer.....dis 75@ 75& 5
Socket Framing and Firmer. Buck. Bros.....dis 25
Socket Firmer & Framing. L. & I. J. White.....dis 30@30 & 5
Tanged Firmers.....dis 40

Clamps.

Snow's adjustable, iron.....dis 40
Hammer's adjustable, iron.....dis 15
Sargent's cabinet, iron.....dis 66⅔&10

Clips.

Axle and spring bar, Norway iron.....dis 55&5&5
Wrought-Iron felloe clips.....₱ lb. 5½c
Steel felloe clips.....₱lb5c

Cockeyes.

discount.....50

Cocks, Brass,

Hardware list.....dis55&2

Coffee Mills.

Enterprise.....20 & 10@30

Compasses, Dividers, &c.

Compasses.....dis 70@70&10
Calipers.....dis 70@70&10
Dividers.....dis 70@70&10
Bemis & Call Co.'s Dividers.....dis 50&10
Bemis & Call Co.'s Compasses & Calipers..dis 45&5
Bemis & Call Co.'s Wing & Inside or Outside.....dis 45&5
Bemis & Call Co.'s Double.....dis 50&10
Bemis & Call Co.'s (Call's Patent Inside) dis 25&5
Excelsior.....dis 50
Cook's Extension.....dis 25
J. Stevens & Co.'s Calipers and Dividers.....dis 25&5

Coopers' Tools.

Bradley's.....discount 20
Barton's.....discount 20
L. & I. J. White.....20 & 5

Corkscrews.

Humason, Beckley Mfg. Co.....dis 40
Clough's patent.....dis 33⅓

Corn Knives.

Clipper.....2.00
X. L. C. R.....4.50
Russetts.....6.50

Cradles.

Grain.....dis 40&10@50

Crowbars.

Cast steel.....₱ lb 4
Iron, steel points.....3½

Curry Combs.

Fitch's Pattern.....dis 40
Rubber.....₱ doz. $10.00, dis 25

Cutlery.

Table.....net
Excelsior Pocket.....net

Dog Collars.

Embossed gilt.....dis 30&10
Leather.....dis 40

Door Springs.

Torrey's Rod, regular size.....₱ doz $1.30
Gem (Coil); list April 19, 1886.....dis 10

Drawing Knives.

Douglass & Middletown.....dis75&10@75&10&5
L. & I. J. White.....dis 20 & 5
Adjustable handle.....dis 20

Drills and Drill Stocks.

Blacksmiths' each.....2.00
Blacksmiths' self-feeding, each...$7.50 discount 20
Breast, P. S. & W.....discount 40 & 10
Breast, Millers Falls.....each, $3.00 dis 25
Ratchet, Weston's.....20@25
Automatic Boring Tools.....each, $1.85
Twist drills.....50&10
Morse.....50&10
Syracuse.....50&10
Standard.....50&10
Cleveland.....50&10

Drill Chucks.

Morse's Beach Patent.....each, $8.00, discount 15
Standard.....dis. 25

Dripping Pans.

Sheet Iron.....6½c

Egg Beaters.

Dover.....per doz. $2.00
Standard.....per gross $12.00

Emery.

	No. 4 to 46 gr.	No. 54 to 150. gr.	Flour.CF F. FF.
Kegs, ₱ lb	4 c	4¼c	2¾c
½ kegs, ₱ lb	4¼c	4¾c	3 c
¼ kegs, ₱ lb	4½c	5 c	3¼c
10 lb cans, 10 in case	6 c	6 c	5 c
10lb cans, less than 10	10 c	10 c	7¼c

Escutch e Pins.

Iron, List Nov. 11, 1885.....dis 50&10@50&10&5
Brass.....65@65&5

Escutcheons.

Door Lock.....Same discounts as Door Locks
Brass Thread.....dis 60
Wood.....dis 25

Files.

Rothery.....40
Nicholson.....60&10
J. Barton Smith.....70
Royal.....75
Heller's horse shoe rasp.....dis 50&10

Faucets.

Frary's Patent Petroleum.....dis 40 &10&2
First Quali y, Cork Lined.....40&10
Self-measuring, Enterprise, per doz $36 dis 20&10

Fly Traps.

Paragon.....₱ doz $1.75

Forks

Hay, Manure and Spading. list.....dis 65&5

Fruit and Jelly Presses.

Enterprise Mfg. Co.....dis 20&10

Fry Pr

Central Stamping Co.'s list.....dis 70
No 0 1 2 3 4 5 6 7 8
₱ doz..$3 00 3 75 4 25 4 75 5 25 6 00 7 00 8 00 9 00

Fluting Scissors.

Discount.....45

Fluting Machines

Eagle 3½ inch.....$2.15, dis 35
Geneva Hand Fluter. White Metal.. ₱ doz. 12.00.....dis 25
Shepard hand. Nos. 85 $15.30. 95 $8, 110 $11 dis 40
Knox, 4½ inch rolls.....$3 25 each } dis 35
Knox, 6 inch rolls.....$3 60 each }
Crown, 4½ in. $3 50: 6-in. $4 00; 8-in. $6 50 each.....dis 35
Crown Jewel.....6-in. $3 50 each, dis 35
American. 5-in. $3; 6-in. $3 40; 7-in. $4 50 each.....dis 35
Crown hand fluter, Nos. 1 $15; 2, $12 50; 3, $10 ₱ doz.....dis 30

Gauges.

Marking.....dis 60&10
Wire.....dis 10&10

Gimlets.

Nail and Spike.....dis 50&10
Double Cut, low list.....25
"Bee".....₱ gross $12, dis 25

Glue Pots.

Tin enamele d.....dis 40@
Family, Handy.....dis 45

Grindstone Fixtures.

Sargent's.....dis70

Gun Wads.

U. M. C. & W. R. A.—B. E., 11up...2 00
U. M. C. & W. R. A —B. E , 9&10... 2 30
U. M. C. & W. R. A.—B. E., 7&8..... 2 60
U. M. C. & W. R. A.—P. E., 11up... 3 10
U. M. C. & W. R. A.—P. E., 9&10... 4 00
U. M. C. & W. R. A.—P. E., 7&8..... 4 90

dis 20&2

Eley's B. E., 11 up.....2 00
Eley's P. E., 11@20.....2 80

Hack Saws.

Griffin's Hack Saws, complete.....dis 40
Griffin's Hack Saw. Blades only.....dis 40
Diamond Hack Saws and Blades.....dis 25

Halters.

Jute horse and cattle ties.....$13.50 gro. net.

Hammers.

Maydole &.....discount 25@25&10
Attra new list, Jan 15, 1887.....dis 40&10@50
Magnetic Tack, No. 1, 2, 3, $1.25, $1.50 and $1.75, dis 30
Heavy hammers and sledges under 5 lbs, 36c, over 5lbs, 30 c.....dis 70

Hand Cuffs and Leg Irons.

Providence Tool Co., hand cuffs. $15 ₱ doz...dis 10
Providence Tool Co., leg irons $25 ₱ doz.....dis 10
Tower's.....dis 15

Handles—

Door or Thumb Latches.

Per doz Nos.	0	1	2	3	4	
Sargent's	.90	1 00	1 18	1 35	1 50	dis 60&10
Roggin's Latches						₱ doz. 30@35c
Bronze Iron Drop Latches						₱ doz. 70c net

Jap'd store door handles—Nuts, $1 62; Plate $1 10; no plate $0 88.....net
Barn door.....₱ doz $1 80, dis 25
Wrought chest.....dis 50 &10 &10
Surface chest.....dis 70
Flush chest.....dis 70
Lifting.....dis 70
Saw and plane.....dis 40&10
Hammer and hatchet.....dis 25&5&2
Brad awl.....₱ gross $2
Hickory firmer chisel, assort.....₱ gross $4 50
Hickory firmer chisel, large.....₱ gross $5 00
Apple firmer chisel, assorted.....₱ gross $5 00
Apple firmer chisel, large.....₱ gross $6 00
Socket firmer chisel, assorted.....₱ gross $3 00
Socket framing chisel, assort.....₱ gross $5 00

dis 40

File. assorted.....₱ gross $2 75
Auger, assorted.....₱ gross $5 00
Auger, large.....₱ gross $7 00

.....25

Hangers.

Barn Door. old patterns.....dis 60&10 &10
Climax (Anti-Friction).....dis 55
Star.....dis 40
Scranton.....dis 25
Kidder's.....dis 50&10
Terry's Patent. 5 in.. 12.00; 3¼ in., 10.00, dis 50
Paragon.....dis 40
Richards.....dis 20&10&10

Harness Snaps

German, new list.....dis 40&10
Covert, New Patent, new list.....dis 50&5&2

Hay Knives.

Lightning.....per doz. $18 dis 30
Electric.....₱ doz $17.00 dis 30

Hinges.

Wrought Strap and T Hinges.....6 &10&2@70&5
Screw, hook and strap, 8 10 12 in.....3¾@4
to 36 in.....2¾@3
Screw hoos & eye hinges...½ ₱ doz 1.50
⅝ 2.45
¾ 3.80
...dis 10
Gate, western.....₱ doz $4 40, dis 55
Gate, N. E.....₱ doz $7 00, dis 55
Gate. N. E. reversible.....₱ doz $5 20, dis 55&10
Gate. Clark's. Nos. 1. 2. 3.....dis60&10@60&10&5
Gate. N. Y. State.....₱ doz $5 00. dis 55&10
Gate, automatic.....₱ doz $12 50, dis 50
Gate, common sense.....₱ doz pair $4 50, dis 50
Gate, Shepard's.....dis 60&10

Hollow-Ware.

Stove Hollow-Ware. Ground dis 60&10@60&10&5
Enameled and Tinned Hollow-Ware
Kettles.....dis 60&10
Saucepans.....dis 40

Galvanized Tea-Kettles

Inch	6	7	8	9
Each	.55	60	65	75

Hoes.

Garden, mortar.....dis 65&5
Planter's. cot.....dis 65&5
Canton.....dis 65&5

Hog Rings and Ringers.

Bill's rings.....$2 50
" ringers.....{ Old Style.....$2 50 / Improved.....$3 60
Blair hog ringers.....₱ doz $2.50

Hooks.

Bird Cage. Sargent's list.....dis 60&10&10
Belt.....dis 75&10
Clothes Line Sargent's list.....dis 60&10
Ceiling Sargent's list.....dis 55&10
Coat and Hat. Sargent's list.....dis 55&10
Wire Coat and Hat. Gem.....dis 45
Wrought Staples and Hooks & Staples. list Jan 12, 1887.....dis80&20
Wire Screw Hooks and Screw Eyes. dis 75&10
Hooks and Eyes—Malleable Iron.....dis 70
Hooks and Eyes—Brass.....dis 60&10&10

Horse Nails.

No.	10	9	8	7	6	
Ausable. ₱ lb	23	24	25	26	28	dis25&10to25&10&10
Putnam, ₱ lb..	19	20	21	22	24	.....dis 15

Essex.....33⅓&5
Capewell.....33⅓

Horse Shoes.

Burden at factory.....₱ keg $4.00
R. I. Horse Shoe Co., Perkins' Imp. at factory.....₱ keg $4 00
Mule Shoes, at factory.....₱ keg $5.00

Hose, Rubber.

Boston Belting Co.....55&10
Extra.....55 a 10
Best.....45&10

Ice Picks, Chisels, &c.

Am. Ice Chisel Pol'd.....₱ doz. $3.00, dis 20

Ice Cream Freezers.

American.....70&10
Gem.....55&10
Crown.....50&10

Ice Tongs.

Champion.....₱ doz $4.00, dis 25&10
Family.....₱ doz $2.75, dis 20@25

Jack Screws.

Illinois Bolt Co. list.....dis 70

Kettles.

Brass. 7 to 17 inches inclusive.....₱ lb 20c. net.
Brass larger than 17 inches.....₱ lb 21c.
Enameled and Tea Kettles.....See Hollow Ware

Keys.

Eagle, cabinet, trunk and padlock...dis 33⅓ and 2

Knives.

Russell's Butcher.....net
Moran's Shoe Knives.....dis 20

Knobs.

Carriage. Japanned.....₱ gross 80c. dis 60&10
Base, Rubber Tip.....dis 70&10&5
Hemacite Door Knobs. new list.....dis 40@40&10
Door Mineral.....75c
Door Por. Jap'd.....90c
Door Por. Por.....3 00@3 25
Door Por. Plated.....2 90@3 00

Ladles.

Melting, Sargent's.....dis 55&10
Melting. Monroe's Patent. ₱ doz $4.00, dis 25&10
Melting, P. S. & W.....dis 25&10

Lanterns

Tubular No. 0.....$5.75 per doz
" " " 1.....8 00
Tubular. Lift Wire. No. 0. ₱ doz.....9.50
Tubular. Lift Wire. No. 1. ₱ doz.....8.00
Police, Small. $6.00; Med.. $7.25; Large. $9.75.....dis20@25

For Sale.

A TWIST DRILL GRINDER, Warner & Hough make (new). J. Benton, care Iron Trade Review. tf

For Sale.

A 6"x10" SELF-INKING Foot Power Printing Press; will do good work. Address J. M., care Iron Trade Review, Cleveland, O. tf

For Sale.

ONE OF DUNN'S HOISTING MACHINES, with over 40 feet of chain. Good as new; capacity, 600 lbs. Address Dunn, care Iron Trade Review, Cleveland, O. tf

Furnace for Sale.

A GOOD Charcoal Iron Furnace, in Michigan. For particulars address E. C. Pope, 31 and 32 Wilshire Building, Cleveland, O. tf

For Sale.

WOODRUFF & BEACH, Hartford, Conn., Automatic Engine. 24x48; Buckeye Automatic Engine, 18x36; John Cooper & Co. Automatic Engine, 20x36; 1 Circular Mill, 68" Saw, Engine and Boiler, direct connected, $600; 2 Sturtevant Boston Blowers, large size.
CLARK CENTER,
93-9ms SANDUSKY, OHIO.

For Sale Cheap.

A NEW No. 4 INJECTOR, never been used. Address Jones, care Iron Trade Review, Cleveland, O. tf

For Sale or Exchange.

THE BRADLEY FACTORY at Ashtabula, O. has switches from two railroads, acre of buildings, large fine engines, boilers, shafting, etc.; finest shipping point on Lakes; no better point for manufacturing; at great sacrifice.
McCONNELL'S BUSINESS EXCHANGE,
208 Superior street. [69] Cleveland, O

Wanted.

A GOOD BUSINESS MAN with capital, to take interest in a manufacturing iron business. 100 per cent. profit. Address J. G. J., care Iron Trade Review. tf

Wanted,

ALL FOUNDRY MEN to know that the Forest City Machine Works, Cleveland, Ohio, manufacture all kinds of Wrought Iron Chaplets and Chaplet Stems with threads under the heads. Write to them for Price List and Discounts.

Wanted to Buy.

A 20 or 24" Power Wood Planer. Address with price and full particulars "K." care Iron Trade Review, Cleveland, O. tf

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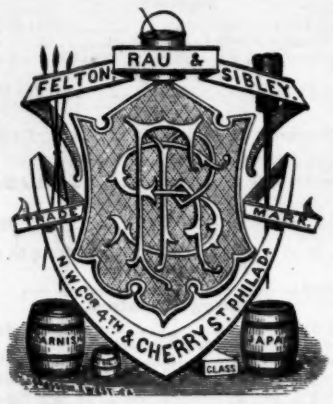

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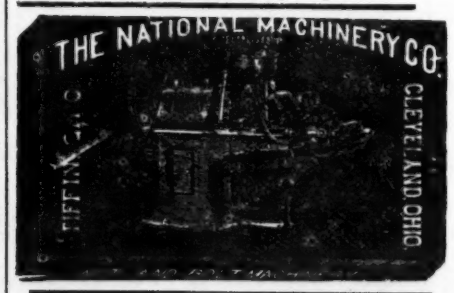

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Shutter hinges & flaps genuine bronze....dis 60&10
Shutter hinges, bronze plated.....dis 70
Flush bolts, genuine bronze.....dis 70
Shutter knobs, genuine bronze.....dis 50
Shutter bars, genuine bronze.....dis 60
Sash lifts, genuine bronze .....dis 60
Sash pulls and plates, genuine bronze.....dis 60
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Ring peavies, "Blue Line" finish.....₱ doz $20 00
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Skidding tongs.....₱ doz $51 00
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Square steel boot calks.....dis 40
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Stebbins' genuine .....dis 66⅔&10
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List July 14 1887.....dis60&10
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Size of bolt in	¼	5-16	⅜	½	⅝	¾	1
Square	8⅛	7.3	5.8	4.9	4.3	4	3.6
Hexagon	21	12	8¾	6¼	5¼	5¼	4¾
Washers	7	5¾	4¾	4	3½	3¼	3½

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Zinc and Tin.....dis 60&10
Brass and Copper.....dis 50
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Sandusky Tool Co.....dis 25

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Hall's Pat. Compound Lever Cutting Nippers, No. 2, 5 in., $13.50; No. 4, 7 in., $21 00 ₱ Doz.....dis 20&10@33⅓
Gas Pliers.....dis 50&10
Humason & Beckley .....dis 50
P. S. & W. Tinners' Cutting Nippers add 6 per cent. dis 10

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Iron, Ordinary, Cooper's Block and Carriage, list October 1, 1886.....dis 60
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Flat head brass	dis 65	
Round head brass	dis 60	
Flat head bronze	65	
Round head bronze	60	
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Machine, round head, iron	50	

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Coach, patent gimlet point..... 66⅔@66⅔&5
Bed.....25&5
Hand rail, ...66⅔&10

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Atkins' patent.....₱ doz sets $6 00

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American (Cast) Iron.....dis75&10
Pruning .....See Pruning Hooks and Shears
Barnard's Lamp Trimmers.....₱ doz $4.00
Tinners'.....dis 20&2
Heinsch's List, Dec. 1881..... dis 60 &10&5
Heinsch's Tailor's Shears.....dis 33⅓

Scroll Saws.

Lester, complete, $10.00.....dis 2
Rogers, complete, $4.00.....dis 2

Sheaves.

Sliding Door R. & E. list Dec 18, 1885... dis 55&
Sliding Door, Patent Roller.....dis 60&10&
Sliding Door, Pat'nt Roller, Hatfield's.....dis 7
Sliding Door, Corbin's Anti-Friction Dec. 18, 188 dis 60&

Ship Tools.

L. & I. J. White.....dis 20 &

Shovels and Tongs.

Iron Head.....50&10&
Brass Head.....5

Sieves.

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Flour sifters { Victor $2 0; Hunter $2 2; Comet $1 2

Slates.

School, by case.....dis 50&5@50&1

Spoke Shaves.

Iron.....dis 3
Wood .....dis 3

Spoke Trimmers.

Bonney's.....₱ dos $10.00 dis 5
Stearns'.....₱ doz $9.00 dis 20&1

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Basting Spoons .....dis 30&1
Britannia.....dis60&1
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Nickel plated..... }
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Winterbottom's try and miter.....dis 30&1

Steelyards.

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Washita Slips No 1.....₱ lb 37@3
Washita No 2 stone.....₱ lb 15
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Daisy.....50&10

Shovels and Spades.

Ames' list Nov 1 1885.....discount 2
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Hussey & Binner, rail road.....8.00

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Joseph Dixon's.....₱ gross $6 00 dis 1
Gem .....₱ gross 4 50 dis 1
Gold medal.....₱ gross 6 00 dis 2
Rising Sun.....₱ gross $5 50 ne
Dixon's plumbago .....₱ lb 8c. net

Trowels.

Lothrops' Brick and Plastering.....dis 2
Reed's Brick and Plastering.....dis 2
Disston's Brick and Plastering.....dis2
Brade's brick.....dis 2

Tacks, Brads, &c.

New List, September 1, 1882. & Supplement Jan. 1, 1886.
American iron carpet tacks all kinds dis75@75&1
Steel carpet tacks all kinds.....7
Swedes Iron carpet tacks all kinds 7
Swedes iron tacks.....70&1
Swedes iron Upholsterers' tacks.....70@10&7
Tinned Swedes iron tacks .....70@10&7
Tinned Swedes iron Upholsterers' tacks 70@10&7
American iron cut tacks .....75@75&1
Copper tacks 6
Copper finishing and trunk nails.....6
Cigar box nails .....60@60&
Finishing nails.....60&10&1
Hungarian nails and miners' tacks.....60&10&1
Gimp and lace tacks.....70@70&5
" " " tinned.....70@70&
Trunk and clout nails .....60&10&
Tinned trunk and clout nails.....60&10&5
Basket nails.....60&1
Chair nails .....60&1
Common and patent brads .....60&10&1
Tinned capped trunk nails 6

Tinware.

Stamped, Japaned & Pieced. list Jan 20, 1887..... dis 75 @ 75&10 pc.

Tobacco Cutters.

Enterprise Mfg. Co. (Champion).....dis 20&10@30

Traps.

Game, Newhouse.....dis 35
Victor.....6
Wood, mouse.....15c ₱ dos holes
Delusion, mouse.....₱ gross $18 00 dis 1

Trammel Lifters.

Wollensak's Patent.....dis 5

Twine.

	BC.	P.
No. 12, Flax Twine, ¼ and ½ lb Balls	21½c	27c
No. 18, " " ¼ and ½ "	21½c	27c
No. 36, " " ¼ and ½ "	20c	25c
2-Ply Hemp, ¼ and ½ lb Balls (Spring Twine)	17	
3-Ply " 1 lb Balls	17½c	
3-Ply " 1¼ lb Balls	16	
Cotton Wrapping, 5 Balls to lb	15@16	

Vises.

Solid box.....60&10&5@60
Parker's.....discount 20@2
Prentiss....." 20 &5@25
Stephen's.....2
Saw Filers, Wentworth's .....dis20&1
Saw filers, Stearn's .....33⅓&1

Washer Cutters.

Smith's Patent .....₱ doz $12 00, dis 20&10&1
Johnson's .....₱ dos $11 00, dis 33⅓
Penny's.....₱ dos Pol. $14 00; Jap'd. $16 00, dis 5
Appleton's.....₱ doz $16 00, dis 60&1
Bonney's.....dis 30&1

Well Wheels.

8 in., $2.00; 10 in., $2.50; 12 in., $3.2

Wire.

New List Jan. 18, 1884

Brass and Copper	discount 25@25&5
Bright and annealed, Nos. 0 @ 18	dis 70&5@72½
" " Nos. 19 @ 26	dis 72½@7
" " Nos. 27 @ 36	dis 75@75&10
Coppered Nos. 0 to 18, market list	dis 65&10@70
Galvanized Nos. 0 to 18 " "	dis 60&7½@65
Tinned market Nos. 0 to 18	dis 65
Cast steel	dis 50
Tinned Broom Wire	dis70@72½
Annealed Fence, Nos. 8 and 9	dis75
Annealed Grape, Nos. 10 to 14	dis 75
Stubs Steel Wire regular	$6 00, @ lb dis30

Wrenches.

[illegible] genuine, cash in 10 days..... 55 & 3
[illegible] standard..... discount 70&10
Agricultural..... discount 5&10
Mecha[illegible]..... dis 55&10 & 3
Bemis & Call's Combination.....25&10
Donehue's Engineers'.....25

TINNERS' STOCK.

Tin.

Banca..... } Market very excited and advancing, prices on application.
Straits.....
English.....
Bar.....

Spelter.

American, cash. ₱ lb..... 4¼@5c

Charcoal Tin Plate.

IC 12x12 225 sheets	$5 50@6 25
IX 14x20 112 sheets	7 00@7 75
IC 10x14 225 sheets	₱ box 5 50@7 00
IC 20x28 112 sheets	11 50@14 00
IX 10x14 225 sheets	7 00@7 75
IX 12x12 225 sheets	7 25@8 00

For each additional X add $1.00@3.00

Coke Tin Plate.

	Best	Ordinary
IC 10x14 } IC 14x20 }	$5 25	

Solder.

Half and Half, in bars warranted.....16
No. 1. Refined.....14¼
Bingham.....17

Zinc.

Zinc, cask.....6
Zinc, open.....6¼

LEAD.

Pig.....4¾@4.80
Bar. ₱ lb.....6
Pipe. ₱ lb.....6½c. net
Sheet. ₱ lb.....6 net
Chilled Shot ₱ bag 25 lbs 1 35
Bell.....5½
J. D.....12
Allen's.....9½
Excelsior.....13
Crescent.....20
W. B. Gennive.....26

BABBIT METAL.

No. 4.....5½
J. D.....12
Allers 9½
Excelsior.....13
Crescent.....20
W. B. Genuine.....26

COPPER.

Lake Ingot.....11¼
Arizona.....10¾

IRON AND STEEL.

Flat Bar

1½ to 4 by ⅜ to 1 inch.....2 10
1½ to 6 by ⅜ to 1 inch.....2 20
1¾ to 6 by 1¼ to 1 inch.....2 50
1¼ & 1¾ by ⅜ to ¾.....2 20
1 & 1¼ by ⅜ to ¾.....2 25
⅝, ¾ and ⅞ by ⅜ to ¾.....2 50

Round and Square.

1¾ inch.....2 10
to 2⅜ 2 30
2¾ to 3¼ inches.....2 60
3⅜ to 4 .....3 10
4¼ to 4½ 3 60
4¾ to 5 .....3 80

Oval.

⅜ to 1¼ inch.....2 50
⅜ to ¾ 2 70
½ 2 90
⅝ .....
¾ 3 30

Hoops.

1¼ to 4, Nos. 13 to 15.....
1¼ to 2, Nos. 16 to 18.....
1 and 1¼, Nos. 13 to 15.....

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch.....2 35
1 to 1⅝ by ¼ and 5-16 inch.....2 45
¾ to ⅞ by ¼ and 5-16 inch.....2 65
⅛ to ⅝ by ¼ and 5-16 inch.....3 15

Half Oval and Half Round.

1¼ to 3 inch.....3 25
⅜ to 1¼ 2 85
⅛ to ¾ 3 35
½ 3 65
¾ 5 15

Light Band.

1¼ to 6 by ⅛ to 3-16.....2 65

Sheet Iron.

No. 22 to 24.....3 10
No. 25 to 26.....3 20
No. 27.....3 30
No. 28 .....3 50

Machinery Steel.

	Crucible.	Bessemer & open-h'rth.
Ordinary sizes, ⅜ to 2 in. round	4	3½
5-16 and 2⅛ to 3 in.	5	4½
¼ and 3⅛ to 6 in.	6	5½
7-32 in.	7	6½
3-16 in.	9	8½

Square, Flat and Octagon, ½c. extra throughout list.
Cut to specified lengths, ½c. extra.

Hammer Cast Steel.

	Cts.
Crucible cast steel	5
Open-hearth steel	4

Steel.

Best Quality Refined Cast Steel—Square, Flat Octagon and Round.

	Cents.
⅛ to 2 inches, inclusive	9
1-16 and 2⅛ to 3 inches	10
¼ and 3⅛ to 4 inches	11
7-32 and 4⅛ to 5 inches	12
3-16 and 5⅛ to 6 "	14½
5-32 "	18½
⅛ "	25½
Oil well steel forgings	18½

Sheet Steel.

	Crucible Best.	2d. Qual.	3d. Qual.	Bessemer & open-h'rth.
To 21 gauge,	9c.	8c.	6c.	5

1c. extra for each additional gauge. Cut to multiples or specified lengths, ½c. extra.

Miscellaneous Cast Steel.

Augur and augur bit 3
Axle steel for wagons.....3
Frog points and plates 5½
Frog size bars 5
Pick, hammered.....5
Skate Steel.....4½
Mattock, beveled.....3
Table cutlery.....3½
Table Cutlery, beveled.....4
Trap spring steel.....6
Pike and cant hook.....7
Coal and granite wedge 7

TRAVELER'S REGISTER.

Standard Time.

In effect September 11, 1887.

N. Y. C. & St. L. R'y—"The Nickel Plate."

EASTWARD.	ARRIVE.	DEPART
Buffalo Passenger	10 40 a m	10 45 a m
Chicago Passenger	9 10 p m	.....
Local Freight	4 40 p m	5 45 a m
WESTWARD.	**ARRIVE.**	**DEPART.**
Chicago Passenger	.....	6 30 a m
Fostoria Passenger	4 46 p m	4 51 p m
Local Freight	5 20 p m	5 50 a m

Rocky River Accommodation departs 7:40 a. m.; 1:40 p. m.

Euclid Accommodation departs 6:24 a. m. 12:10 a. m., 5:05 p. m.

All trains daily, except Sunday.

Cleveland & Pittsburg.

	ARRIVE.	DEPART.
New York Express	*12 55 p m	7 45 a m
New York Express	6 30 p m	12 10 p m
Alliance Accommodation	9 35 a m	4 15 p m
Ravenna Accommodation	8 25 a m	5 00 p m
Night Express	* 5 25 a m	*11 10 p m
Bedford Accommodation	3 17 p m	1 40 p m

Train leaving at 12:10 p. m. has Pullman Buffet Sleeper from Cleveland to New York, arriving in New York at 7:30 next morning.

*Daily; all other trains daily except Sunday.

Mt. Vernon & Pan Handle Route

C., A. & C. Ry. Co.	ARRIVE.	DEPART.
Akron, Col. & Cin. "Flyer"	5 40 p m	8 10 a m
Akron, Col. & Cin. Night Express	6 45 a m	8 00 p m
Akron & Columbus Exp	12 55 p m	12 10 p m
Akron & Orrville Accom	9 35 a m	4 15 p m

The 8 p. m. train runs daily. Elegant Pullman palace sleeping cars attached. All other trains daily except Sunday.

New York, Pennsylvania and Ohio.

	ARRIVE.	DEPART.
N. Y. & Pitts. Express	15 58 a m	*8 25 a m
Fast N. Y. & Pitts. Express	*10 55 a m	*3 00 p m
Mahoning Accommodation		†6 40 a m
Pittsburgh Express	†6 25 p m	
Youngstown Local	†8 05 a m	
Mahoning div. and Pitts Local		*11 40 a m
Mahoning Val Accom		*4 30 p m
Pittsburgh Express	†1 20 p m	11 10 p m
New York Express	*8 00 p m	

* Daily. † Daily except Sunday. ‡ Daily except Monday.

Lake Shore & Michigan Southern Railroad.

TRAINS GOING EAST.	Arrive from West.	Depart East.
No. 4, Fast Limited Ex	2 55 a m	*2 55 a m
No. 8, N. Y., B't'n & At. Ex	*8 30 a m	*8 55 a m
No. 26, Elyria Accom	†7 45 a m	.....
No. 24, Toledo & Buffalo Accom. via Sandusky	†10 05 a m	†10 15 a m
No. 24, Buffalo Accom	†10 05 a m	†10 15 a m
No. 10, N. Y. & Boston "Flyer,"		*11 35 a m
No. 12, N. Y. & Bos. Ex.	*2 20 p m	*2 45 p m
No. 2, Night Express	†9 40 p m	†10 00 p m
No 28, Conneaut Accom	.....	†4 25 p m
TRAINS GOING WEST.	**Arrive from East.**	**Depart West.**
No. 1, Fast Limited Ex	*12 15 a m	*12 15 a m
No. 23, Cleveland Express	*2 15 a m	
No. 3, Chi. Ex. via Sand'y.	†5 20 a m	†5 35 a m
No. 25, Mich. Ac. via Norw'k	.....	†5 35 a m
No. 21, Toledo Ex. via Norwalk and Sandusky	†12 50 p m	†3 20 p m
No. 5, Fast St. Louis & Chicago Ex. via Sandusky	*10 50 a m	*10 55 a m
No. 9 hi. Pac. Ex. via Nor'k	*6 15 p m	*6 40 p m
No. 31, Elyria Accommodation, to Elyria only	.....	†4 30 p m
No. 27, Conneaut Accom	†8 10 a m	.....

Sunday train for Nottingham—Depart 8:15 a. m. and 1:45 p. m.; returning, leave Nottingham at 8:50 a. m. and 3:45 p. m.

Reference marks—*Daily. †Daily except Sunday. ‡Daily except Monday.

A local Cleveland and New York Sleeper and dining car daily on No. 10, leaving Cleveland at 11:35 a. m., arrives Grand Central Depot, New York 7:30 a. m.

For further information as to trains and connections apply at the Union Ticket Office, corner Bank & Superior-sts., under Mercantile Bank.

M. E. GAUL, City Pass. Ag't. A. J. SMITH, Gen'l Pass. & Ticket Ag't.

Cleveland and Canton Railroad.

Arrive.—Canton, Sherrodsville and Coshocton 9 55 a.m., 7 00 p.m.

Kent—*7 50 a.m., *7 16 p.m.

Bedford—*7:50 a.m., 1:05 p.m., 7 16 p.m.

Newburgh and Miles avenue—7:10 a.m., 4:15, p.m. 5:33 p.m.

Depart—

Canton, Sher'dsville & Cosh't'n—7:00 a.m. and 3:10 p.m.

Kent—*8:38 a.m. and *8:36 p.m.

Bedford—*8:38 a.m., 4:45 p.m., 11:10 a.m., 5:45 p.m.

Newburgh and Miles Avenue—6:12 a.m., 2:00 p.m., 4:40 p.m.

Trains marked with * run daily. All others daily except Sunday.

Depot at Ontario street, opposit Huron street

Valley Railway.

	ARRIVE.
From Akron	8 20 a m
From Canton	10 30 a m
From Akron	3 05 p m
From Valley Junction	6 00 p m
	DEPART.
For Valley Junc. and interme. points	7 50 a m
For Valley Junc. and interme. points	12 20 p m
For Canton and intermediate points	4 00 p m
For Akron	7 45 p m

Trains leave depot, South Water Street.

Cleveland, Lorain and Wheeling.

	DEPART.	ARRIVE.
Wheeling Express	6 45 a m	6 55 p m
Ubrichsville Express	4 00 p m	9 20 a m

J. E. Scott, Mfgr. of **Awnings & Tents** of every description.

Water-proof Horse Clothing, &c.

10 and 12 Woodward Ave., [92-1y] DETROIT, MICH.

WHEELING & LAKE ERIE

TIME TABLE—IN EFFECT SEPT. 4, 1887.

Central Standard Time.

EASTWARD.	No. 5.	No. 7.	No. 9.*	No. 1.*
Toledo.....lv	7 45 AM	1 00 PM	4 20 PM	.....
Oak Harbor...ar	8 41	1 53	5 45	.....
Fremont	9 07	2 18	6 10	.....
Clyde	9 24	2 34	6 25	.....
Bellevue	9 40	2 48	6 40	.....
Monroeville..lv	9 58	3 05	7 01	3 10 AM
Norwalk	10 15	3 22	7 17	3 22
Wellington	11 05	4 13	8 08	4 03
Creston.....ar	11 53	5 05	8 55 PM	4 47
Orrville.....ar	12 20 PM	5 35	5 15AM	5 15*
Orrville.....lv	12 40	5 40	7 00	7 00
Massillon.....ar	1 20	6 20	7 42	7 42
Massillon.....lv	1 20	6 20	7 42	7 42
Navarre	1 35	6 35	8 00	8 00
Valley Junc.lv.	2 15	7 20	8 45	8 45
New Cumberl'd	2 28	7 33	9 05	9 05
Sherrodsville	2 40	7 45	9 22	9 25
Leesville	2 48	7 53	9 40	9 40
Bowerston.....ar	2 55PM	8 00PM	9 50AM	9 50AM
Canal Dover	3 42 PM	7 30PM	.....	.....
New Comerst'n	4 28	6 30 AM	.....	.....
Cambridge	5 25	7 30	.....	.....
Macksburg	6 56	9 03	.....	.....
Marietta.....ar	8 10 PM	10 15AM	.....	.....

WESTWARD.	No. 6.	No. 8.	No. 4.	No. 2*.
Marietta.....lv	6 50 AM	12 15 PM	.....	.....
Macksburg	8 04	1 26	.....	.....
Cambridge	9 40	3 00	.....	.....
New Comerst'n	10 50	4 00	.....	.....
Canal Dover	11 32 AM	4 40PM	.....	.....
Bowerston	11 25 AM	3 45PM	6 35 AM	.....
Leesville	11 32	3 55	6 43	.....
Sherrodsville	11 40	4 10	6 53	.....
New Cumberl'd	11 52	4 25	7 07	.....
Valley Junc	12 20 PM	5 02	7 25	.....
Navarre	12 50	5 35	8 00	.....
Massillon	1 05	5 50	8 15	.....
Orrville.....ar	1 40	6 25	8 53	.....
Orrville.....lv	1 45	6 35*	8 58	*
Creston.....lv	2 18	7 02	9 28	5 30 AM
Wellington	3 05	7 43	10 15	6 20
Norwalk	3 55	8 25	11 25	7 25
Monroeville	4 07	8 35	11 37	7 35
Bellevue	4 23	9 15	11 55	7 51
Clyde	4 39	9 29	12 10 PM	8 06
Fremont	4 55	9 45	12 28	8 23
Oak Harbor	5 20	.....	12 53	8 45
Toledo.....ar	6 15 PM	10 45*	1 50 PM	9 40 AM

No. 27	No. 25	Huron Divis'n.	No. 26	No. 24
4 35 PM	9 30AM	Ar. Huron ..Lv	12 45 PM	.....
4 18	9 12	Friese Landing	1 00	.....
4 05	9 00	.....Milan	1 17	6 55
Lv 3 40	Lv 8 35	.....Norwalk	Ar 1 40	Ar 7 15
Ar 3 00	Ar 8 35		Lv 2 10	Lv 7 30
2 40 PM	8 15AM	...Monroeville..	2 30PM	8 10AM

* Daily.

This road is now open through from Toledo to Bowerston, connecting with the Pennsylvania System for all points East.

THROUGH CAR SERVICE.

Between Toledo, Cambridge and Marietta.
" " and Bowerston.
" " and Akron, Youngstown and Pittsburgh.
" Chicago, Akron, Youngstown and Pittsburgh.

M. D. WOODFORD, Gen'l Manager. JAMES M. HALL, Gen'l Pass. Agt.

Scioto Valley Railway

TIME TABLE.

In effect Aug. 8, 1886.

THE SHORT LINE TO ALL POINTS

North and South, East and Southeast, West and Northwest.

TRAINS GOING SOUTH

STATIONS.	No. 2.	No. 4.	No. 6.
Columbus.....Lv	7 00 a.m	11 25 a.m	5 30 p.m
Valley Crossing	7 22 "	11 47 "	5 52 "
Lockbourne	7 34 "	11 58 "	6 04 "
Ashville	7 50 "	12 12 p.m	6 20 "
Circleville	8 12 "	12 34 "	6 42 "
Kingston	8 34 "	12 54 "	7 04 "
Chillicothe	9 01 "	1 35 "	7 50 "
Sharon	9 40 "	2 11 "	8 30 "
Waverly	9 50 "	2 20 "	8 38 "
Piketon	10 02 "	2 34 "	8 52 "
Big Run	10 18 "	2 50 "	9 08 "
Lucasville	10 36 "	3 09 "	9 25 "
Portsmouth	11 00 "	3 35 "	9 50 "
Sciotoville	11 16 "	3 51 "	10 06 "
Wheelersburg	11 22 "	3 57 "	10 12 "
Havernill	11 43 "	4 18 "	10 33 "
Hanging Rock	11 54 "	4 29 "	10 44 "
Ironton	12 04 p.m	4 39 "	10 54 "
Petersburg	12 15 "	4 50 "	11 06 "
Ashland.....Ar	12 45 p.m	5 20 p.m	11 35 p.m

Trains Nos. 2 and 4 daily, except Sunday.
Train No. 6 daily.
Train No. 6 takes supper at Chillicothe.

TRAINS GOING NORTH.

STATIONS.	No. 1.	No. 3.	No. 5.
Ashland.....Lv	2 45 a.m	8 47 a.m	5 25 p.m
Petersburg	3 15 "	9 17 "	5 55 "
Ironton	3 26 "	9 28 "	6 06 "
Hanging Rock	3 36 "	9 38 "	6 16 "
Havernill	3 46 "	9 49 "	6 27 "
Wheelersburg	4 06 "	10 10 "	6 48 "
Sciotoville	4 12 "	10 16 "	6 54 "
Portsmouth	4 27 "	10 32 "	7 10 "
Lucasville	4 49 "	10 56 "	7 35 "
Big Run	5 40 "	11 14 "	7 52 "
Piketon	5 18 "	11 30 "	8 08 "
Waverly	5 30 "	11 43 "	8 21 "
Sharon	5 40 "	11 53 "	8 30 "
Chillicothe	6 35 "	12 55 p.m	9 20 "
Kingston	7 03 "	1 26 "	9 46 "
Circleville	7 26 "	1 48 "	10 07 "
Ashville	7 50 "	2 10 "	10 29 "
Lockbourne	8 06 "	2 26 "	10 43 "
Valley Crossing	8 18 "	2 38 "	10 55 "
Columbus.....Ar	8 40 a.m	3 00 p.m	11 17 p.m

Train No. 1 daily.
Trains Nos. 3 and 5 daily, except Sunday.

COUPON TICKETS, by the best routes and to all principal points in the United States and Canada, can be found at the following Stations: Columbus, Circleville, Kingston, Chillicothe Waverly, Portsmouth, Ironton, A. C. & I. Ashland.

For further information relative to rates, connections and through time, call on your Ticket Agent, or address J. ROBINSON, Receiver.

JNO. J. ARCHER, Gen'l Pass. & Ticket Ag't. Columbus, Ohio.

Ft. Wayne, Cincinnati & Louisville RAILROAD.

THE POPULAR ROUTE

BETWEEN THE

NORTH and SOUTH

THE DIRECT ROUTE TO OR FROM

FORT WAYNE, INDIANAPOLIS, TERRE HAUTE, EVANSVILLE, AND ST. LOUIS.

13 MILES SHORTER 13
—BETWEEN—
Fort Wayne and Indianapolis
Than any other Route.

22 MILES SHORTER AND QUICKER 22
By 3 HOURS, Between
Louisville and Fort Wayne.

No change of Cars
—BETWEEN—
Cincinnati and Fort Wayne,
Via White Water Railroad.

All trains arrive and depart from Central Union Passenger Station Cincinnati, Corner Third Street and Central Avenue.

DIRECT CONNECTION

At Fort Wayne with L. S. & M. S. Trains for all points North and East.

Ask for Tickets
—VIA—
Ft. Wayne, Cincinnati & Louisville Railroad.

For sale by all Agents of connecting lines, EAST, WEST, NORTH AND SOUTH.

W. W. WORTHINGTON, Gen'l Supt. ROBT. F. KINNAIRD, Gen'l Ticket Agent, FORT WAYNE, IND.

New York, Lake Erie & Western R. R.

COMMENCING

July 1, 1887

—THE NEW—

Lake Erie & Western R. R.,

Lessee New York, Penn. & Ohio R. R.

—WILL PLACE ON SALE—

THOUSAND MILE TICKETS

good one year from date of issue, at the rate of

$20.00.

These tickets will be accepted for passage not only on all divisions of the N. Y. P. & O. R. R., but also over the entire "Erie" system, in like manner. Mileage tickets issued by the "Erie" will be accepted over the N. Y., P. & O. R. R. Their use will not be confined to one person only, but when issued to the head of a family, will be good for any members thereof, or for the entire family when traveling together; and when issued to business houses or firms, they can be used by any one member or representative thereof traveling at their expense, but only by one person at a time.

All mileage books purchased previous to July 1st will be accepted for passage over the entire "Erie" system.

The Picturesque Lehigh Valley Route.

Three through trains with Pullman cars attached are now run via by this beautiful scenic route, between Suspension Bridge, Buffalo, New York and Philadelphia, leaving Suspension Bridge 8:18 A. M. 4:10 and 7:45 P. M., Buffalo 9:00 A. M. and 4:40 and 10:00 P. M., connecting with all trains from the West.

Passengers between the East and West passing over the famed LEHIGH VALLEY ROAD will experience the pleasure of a trip through the most magnificent and picturesque scenery in the world, presenting an ever varying panorama of delightful surprises.

Double track, steel rails, magnificent road bed and unrivaled equipment, all combine to make the LEHIGH VALLEY the favorite and most desirable route between the East and the West.

Anthracite Coal is used entirely, guaranteeing to passengers perfect freedom from the dense volumes of smoke that so greatly annoy passengers on lines using Bituminous Coal.

E. B. BYINGTON, Gen'l Pass. Agent, Mauch Chunk, Pa

New York, Penn. and Ohio Railroad

N.Y., L.E. & W. R.R. CO. LESSEES.

New York, Boston and the East.

THE SHORTEST AND QUICKEST ROUTE TO PITTSBURGH, WASHINGTON AND BALTIMORE, AND THE SOUTHEAST.

Change of time goes into effect Oct. 30, 1887.

Central, or Ninetieth Meridian time, 33 minutes slower than Cleveland city time.

Until further notice trains will leave from the New Central Depot, South Water Street and Viaduct, as follows:

	Depart.
No. 62, Mahoning Valley Accommo	† 6 40 a m
No. 72, New York Express,	* 8 30 a m
No. 72, Fast Pittsburgh Express	* 8 36 a m
No. 64, Fast New York Express	* 3 00 p m
No. 64, Pittsburgh Express	* 3 00 p m
No. 66, Mahoning Valley Accommo	* 4 55 p m
No. 66, Pittsburgh Local	† 4 55 p m
No. 68, Pittsburgh Express	†11 10 p m
No. 68, New York Express	†11 10 p m
No. 70, Pittsburgh Local Express	*11 40 a m
	Arrive.
No. 61, New York Express	† 6 10 a m
No. 61, Pittsburgh Express	† 6 00 a m
No. 65, Fast New York Express	*10 50 a m
No. 65, Pittsburgh Express	*10 50 a m
No. 67, Pittsburgh Express	† 1 20 p m
No. 63, New York Express	* 9 05 p m
No. 69, Pittsburgh Express	* 6 29 p m
No. 77, Youngstown Local	* 8 00 a m
No. 13, Erie Express, carrying express matter only, from all points East and South-east, carries no passengers (except Monday)	† 1 20 p m

* Daily .† Daily, except Sunday.

☞ This is the only route by which passengers can reach Corry, Elmira, Binghampton, New York City and intermediate points without change. One change to Boston and New England cities.

Baggage checked through to all points East.

Through tickets and information regarding the route can be obtained at office, 141 Superior street, and at Depot N.Y., P. & O. Railroad, South Water street and Viaduct, Cleveland. Ship by Erie Express. R. H. Soule, Gen. Manager. New York City.

L. P. FARMER, Gen'l Pass. Agent, New York.

M. L. FOUTS, Passenger Agent. 141 Superior Street, Weddell House, Cleveland, O.

Cleveland & Marietta R. R.

New Through Line Between the Ohio River the Great Lakes.

The popular line to Chicago, St. Paul, Milwaukee, Minneapolis, and all points in the Great Northwest. Direct connection for the Pennsylvania Oil Fields and all points East and Southeast. December 5, 1886.

GOING NORTH.			GOING SOUTH.
No. 2.	No. 4.	STATIONS.	No. 3.	No. 1.
6 50 AM	12 15 PM	lv..Marietta..ar	8 10 PM	10 15 AM
7 32	12 55	.....Whipple.....	7 2	9 34
7 42	1 05	.....Warner.....	7 19	9 24
7 55	1 18	.....Elba.....	7 04	9 11
8 04	1 26	...Macksburg...	6 56	9 03
8 13	1 34	...Dexter City...	6 48	8 55
8 35	1 55	.....Caldwell.....	6 26	8 30
8 45	2 05	..Belle Valley...	6 16	8 21
9 08	2 27	..Pt. Pleasant...	5 52	7
9 20	2 40	.....Byesville....	5 40	
9 40	2 55	....Cambridge....	5 25	
10 05	3 25	...Kimbolton ...	4 58	7 03
10 40	4 00	N. Comerstown	4 28	6 30
11 12 AM	4 22 PM	..Phillipsburg ..	4 02	6 10
11 32	4 40	...Canal Dover..	3 42	5 52
11 50	5 00	.. Valley Junc...	3 20	5 30
12 52 PM	8 13 AM	.....Canton.....	2 28	8 02 PM
1 49	9 10	..... Akron.....	1 32	7 05
3 00	10 30	... Cleveland....	12 20	5 45
1 23	5 33 PM	....Massillon ...	1 23 PM	5 45
2 40	7 02	.....Creston.....	11 52	4 38
4 10	8 25	.....Norwalk.....	10 13	2 55
6 35	.....	.....Toledo.....	7 45	12 36
12 05	4 55	....Coshocton...	1 50 PM	.....
2 05	5 55	....Zanesville ...	11 50 AM	.....
1 25	6 10	.....Newark.	12 45 PM	.....
2 20	7 10	....Columbus....	11 45 AM	.....
6 20	.....	... Cincinnati ...	7 45 AM	.....
.....	7 05	.....Chicago.....	8 30 PM	.....
1 42	A. M.	...Steubenville..	1 52	12 47 PM
3 26	.....	...Pittsburgh...	12 05	11 15 AM

	No. 8.
Leave.....Marietta	3 00 PM
.....Whipple	3 55
.....Warner	4 10
.....Elba	4 28
.....Macksburg	4 42
.....Dexter City	4 54
.....Caldwell	5 30
.....Belle Valley	5 45
.....Point Pleasant	6 26
.....Byesville	6 43
.....Cambridge	7 00

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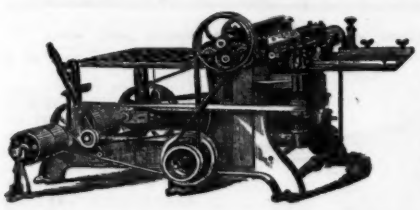

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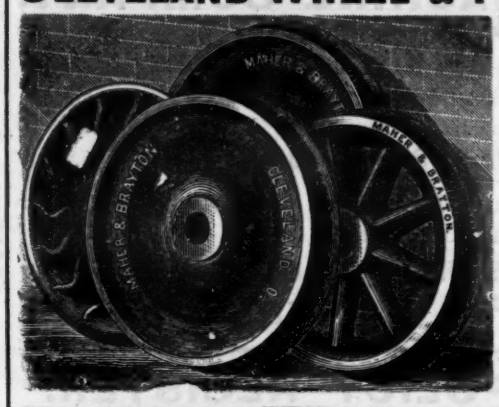

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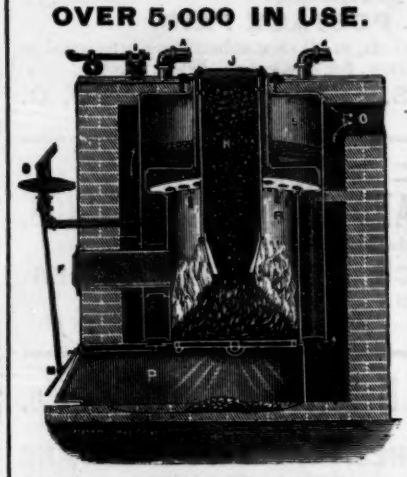

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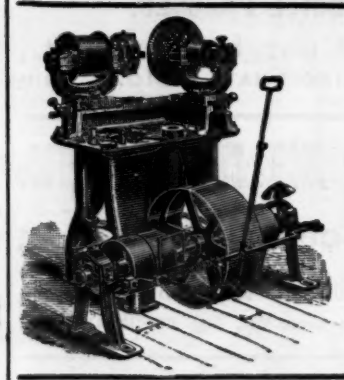

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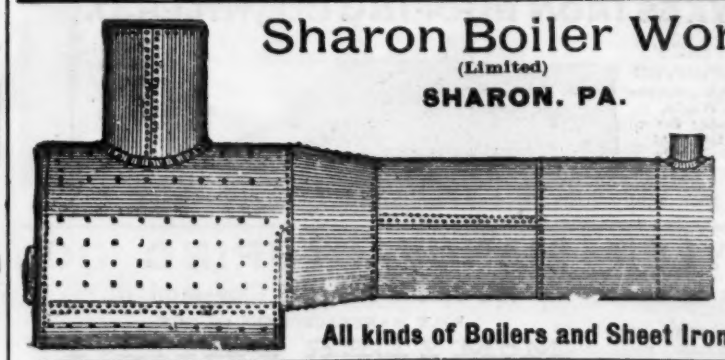

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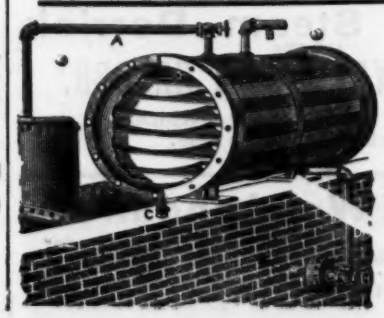

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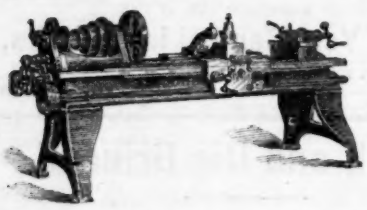

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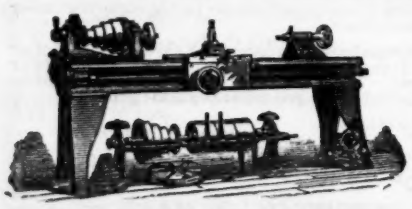

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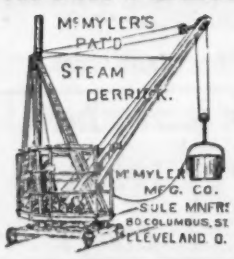

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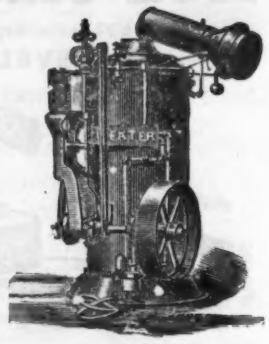

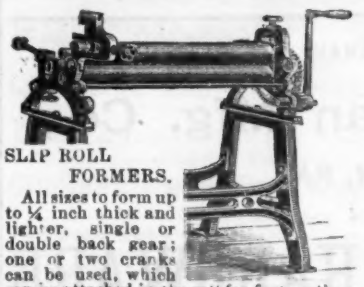

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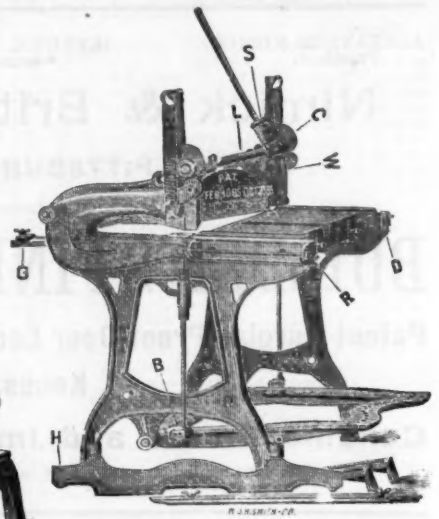

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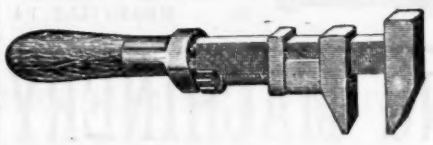

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